GA–A25757

DIII–D YEAR 2007 EXPERIMENT PLAN

by
DIII–D RESEARCH TEAM

MARCH 2007

GENERAL ATOMICS

DISCLAIMER

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GENERAL ATOMICS PROJECT 30200
MARCH 2007

GENERAL ATOMICS

FOREWORD

This document presents the planned experimental activities for the DIII-D National Fusion Tokamak Facility for the fiscal year 2007. This plan is part of a five-year cooperative agreement between General Atomics and the Department of Energy. The Experiment Plan advances on the objectives described in the DIII-D Tokamak Long Range Plan (GA-A23607). The Experiment Plan is developed yearly by the DIII-D Research Council and approved by DOE. DIII-D research progress is reviewed quarterly against this plan. The 2007 plan is for 10 weeks of tokamak research operations.

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2007 Campaign — October 2006 to September 2007

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1. SYNOPSIS OF THE 2007 DIII–D RESEARCH PLAN

The research campaign for 2007 has been organized into six research thrusts and the ongoing four Topical Science Areas. Approximately 60% of the 10 weeks of experimental time has been allocated to the research thrusts, since these activities are aimed directly at critical objectives for the DIII-D Program and urgent needs for the finalization of the ITER design. Additional experimental time in the topical areas maintains the breadth and scientific depth of the DIII-D Program. Below we convey the essential content of the various research thrust and topical science experiments and their goals and anticipated results. The research described is based on a 10-week experimental campaign. To allow for contingency, experimental time has been allocated for 38 run days out of a possible 50 run days, with 12 days of contingency and director's reserve. Additional detailed information can be found on the web, and related links: http://fusion.gat.com/diii-d/Exp07.

The 2007 campaign follows a very successful 2006 campaign in which 12 weeks of operation were completed in a 4-month period. This followed the one-year long Long Torus Opening Activity (LTOA), in which several significant upgrades were made to the DIII-D facility. These include: 1) reorientation of the 210-degree neutral beam line to provide 5 MW of neutral beam power directed opposite from the remaining five sources, allowing balanced neutral beam injection up to 10 MW input power; 2) installation of an extended shelf in the lower divertor to allow pumping of high triangularity single-null and double-null plasmas; and 3) additional ECH power and pulse length (up to 10 s, still in progress). During this campaign, many experiments were conducted in support of the physics needs of ITER as identified by the International Tokamak Physics Activity (ITPA) working groups (Table I). ITER will be supported more directly in 2007 as we focus on urgent design issues identified by the ITPA and USBPO (Table II) to provide input to the ongoing ITER design review. With the extensive set of upgrades, the 2006 campaign barely scratched the surface of the progress to be made. In the 2007 campaign, we will continue to explore new areas of physics and scenario development made available by the LTOA additions.

Table I
DIII–D Conducted a Number of Experiments in 2006 in Support of the International Tokamak Physics Activity (ITPA)

ITPA Area	Title	DIII-D Experiment
CDB-8	ρ* scaling along an ITER relevant path at both high and low β	ρ* scaling at low rotation
TP-4.2	Low momentum input operation effects on E×B shear and reduced transport	Low rotation hybrid development
TP-5	QH/QDB plasma studies	QH-mode in normal I_P Co- vs counter-beam balance in QH-mode Investigate theories of EHO
TP-6.3	NBI-driven momentum transport study	Rotation control
TP-7	Measure ITG/TEM line splitting and compare to codes	Turbulence vs Mach number
PEP-14	QH/QDB with co/counter rotation control in JT-60U and DIII-D	QH-mode in normal I_P Co- vs counter-beam balance in QH-mode
DSOL-11	Disruption mitigation experiments	Disruption mitigation
DSOL-16	Determination of the poloidal fueling profile	Main chamber recycling
MDC-1	Disruption mitigation by massive gas jets (DSOL-11)	Disruption mitigation
MDC-2	Joint experiments on resistive wall mode physics	Low rotation RWM target development RWM stability limit vs rotation profile shape
MDC-9	Fast ion redistribution by beam driven Alfvén modes and excitation threshold for Alfvén cascades	Fast ion transport by Alfvén eigenmodes
SSO-1.1	Document performance boundaries for steady state target q-profile	AT q profile optimization Target q profile controller
SSO-1.2	Qualify other q-profiles for steady state operation	AT q profile optimization Target q profile controller
SSO-2.1	Complete mapping of hybrid scenario	Hybrid in lower SND shape Low rotation, hybrid development Expand hybrid regime to high I_P and B_T
SSO-2.2	MHD effects on q-profile and confinement for hybrid scenarios	MHD effect in hybrid plasmas
SSO-2.3	ρ* dependence on confinement, transport and stability in hybrid scenarios	ρ * Scaling at low rotation; Hybrid in lower SND shape; Low rotation, hybrid development; Expand hybrid regime to high I_P and B_T
SSO-3	Real-time q-profile control in hybrid and steady state scenarios	AT q profile optimization Target q profile controller
DIAG-2	Environmental tests on diagnostic first mirrors (FMs)	Main chamber recycling

Table II
ITER Urgent Design Issues are a Major Focus for the DIII–D 2007 Campaign

Research Topic	ITPA Issue Card	USBPO Issue Card	DR&PO Working Group Task	DIII-D Experiment
Control of tritium inventory, choice of first wall material	TRITIUM-1 FW-2	1.9-20	5	Pre-boronization high performance Erosion/redeposition with carbon Oxygen bake
Non-axisymmetric coils for ELM mitigation	ELM-4	1.9-12	8.1	Mode spectrum dependence of ELM control Rotation dependence of RMP ELM control n=1 or n=2 RMP for ELM control Pedestal particle transport during RMP ELM control
Feedback control coils for RWM stabilization	RWM-1	1.9-12	8.2	RWM stability vs plasma rotation Transition from DECF to feedback Feedback control of ELM-driven RWMs Advanced RWM feedback algorithms
Plasma rotation control	AUX-1	1.9-18	8.3	Intrinsic rotation and modulated momentum transport
Electromagnetic and thermal loads from disruptions		1.9-15		Disruption mitigation with medusa valve
Disruption avoidance and mitigation	DISR-1	1.9-15	4	Disruption mitigation with medusa valve
Pellet injection, other systems for ELM control	ELM-6	1.9-14	9	(piggyback)
RF systems for NTM control		1.9-16		Develop slowly rotating (~5 kHz) 2/1 island checking out both PCS control of n=1 Mirnov rotation frequency and of EC modulation (deferred) Evaluate CW vs MOD and narrow vs broad ECCD control of 2/1 NTMs (deferred)
Validation of startup scenarios		1.9-13	7	ITER start-up scenario testing
Projections of advanced operating modes			2	Expanding hybrid scenario at low rotation plasmas Role of the pedestal region on global confinement in hybrid and conventional H-modes Dependence on T_i=T_e at low collisionality Extend steady-state scenario to 2 τ_R Demonstrate FW electron heating in steady-state scenario Bootstrap current optimization Exploration of $\beta_N > 4$

The experimental plan was compiled based on input and prioritization provided by the 2007 DIII-D Research Council. The Research Council develops a research plan on an annual basis based on the "DIII-D Five-Year Program Plan 2003–2008," January 2003, GA-A23927, with adjustments made for scientific and programmatic issues identified since that plan was written. In particular, with the recent signing of the ITER agreement, and a design review currently underway, the experimental plan for 2007 emphasizes issues that may impact the ITER design, as identified by the ITER Design Review committees, International Tokamak Physics Activity (ITPA) groups, and the US Burning Plasma Organization. To support these research topics, the research thrusts and topical science areas put in place for 2006 will continue through the 2007 research campaign.

In October 2005, a call for experimental research proposals towards the DIII-D objectives was issued and over 575 proposals were submitted and presented at a community-wide Research Opportunities Forum (ROF) on November 15-17, 2005. The overall interest of the general fusion community in research on DIII-D is exemplified by the large number of proposal submissions that were received from universities and other US and foreign labs (Table III). Over 50% of these proposals were from current or potentially new collaborators including significant participation from foreign labs. At the ROF, presentations were made from 10 remote locations (including Princeton Plasma Physics Laboratory, Massachusetts Institute of Technology, Oak Ridge National Laboratory and five foreign labs). The interest shown in the DIII-D program is partly a

Table III
Proposal Statistics for the 2006 and 2007 Campaigns

Area	Proposals Received	Unique Proposals	Proposals in 12-week Plan for 2006	Proposals in 10-week Plan for 2007	Backlog of Proposals Post 2007
Stability TSA	70	64	5	6 (4 days + four 2 h shifts)	53
Boundary TSA	60	60	5	7 (4 days)	48
Confinement TSA	93	83	7	5	71
H&CD TSA	50	40	1	2	37
Advanced scenario development	59	37	4	7	26
ELM control for ITER	109	94	6	7	81
ITER hybrid scenarios	47	37	5	3	29
NTM control for ITER	13	7	3.5	0	3.5
RWM control for ITER	56	40	9	8 (6 days)	23
Pedestal width physics	29	22	1	1	20
Totals	586	484	46.5	46 (39 days)	392.5

result of DIII-D's commitment to domestic and international collaborations as well as its participation in the ITPA process. The planning process done in 2005 was intended to identify experiments to be carried out over two years. The 2007 experimental plan draws from the same set of proposals, with priorities adjusted as above. A listing of the proposals received at the ROF is included as Appendix A of this report and can be viewed at http://d3dnff.gat.com/opportunity/2005/review.asp.

From these proposals, the various thrust and topical science area leaders met with their groups and developed a proposal for experimental time, based on DIII-D management's request to limit the proposed time in each area to a maximum of 8 days. This plan was then presented to the Research Council. Subsequently, the Research Council provided advice to the Director on the relative allocation of experimental time amongst the various areas. Based on this input, the Director established the experimental allocation for each program area.

Adjustments to these allocations, in support of an increased focus on urgent ITER issues, were made on the advice of the DIII-D PAC. Specification of coil sets for control of ELMs and resistive wall modes (RWM) are critical near-term issues for ITER, with a potential major impact during the ongoing ITER design review. With both internal and external control coil sets, DIII-D has unique capabilities to address these issues. Two days were reprogrammed to Thrust IT-1 to develop criteria for selecting ELM control coils in ITER. One day was reprogrammed to Thrust IT-4 to determine the requirements for RWM control in ITER. This time was made available by deferring neoclassical tearing mode (NTM) control experiments in Thrust IT-3 to the 2008 campaign and by assigning one day previously allocated as Director's Reserve. It was felt that recent changes to the ITER ECH launchers reduced the criticality of the NTM experiments. Also, DIII-D's capabilities for research in this area are less unique.

The final run plan (Table IV) reflects the DIII–D Team's commitment to support the ITER Design Review process, as embodied by issues identified by the ITPA, US BPO, and the ITER Design Review Working Groups. The plan is highlighted by experiments in support of urgent issues, where our research results may have an immediate impact on the ITER design itself. Experiments where DIII–D has unique capabilities to address these issues have been given highest priority.

DIII-D continues to have a large research backlog as is shown in Table III. A measure of this backlog is obtained from comparing the number of proposals that the area leaders expect can be reasonably completed in a 22-week campaign during 2006-2007 (92.5) compared to the total number of unique proposals (484). This leaves a proposal backlog of 392.5 proposals. The combined 2006/2007 campaign, therefore, will only allow 19% of the proposed research to be conducted.

Table IV
Run Time Allocations for the 2007 Experiment Campaign

No.	Thrust Name	Description	Plan (Days)	ITPA/IEA Experiments	Area Leaders
AT-1	Advanced Scenario Development	Demonstrate the feasibility and develop the physics basis and control tools for steady-state, high fusion gain tokamak operation	7	6	**T. Luce** E. Doyle
IT-1	ELM Control for ITER	Develop techniques for controlling ELM particle and energy losses for ITER	7	7	**M. Fenstermacher** T. Jernigan
IT-2	ITER Hybrid Scenarios	Develop, assess, and qualify candidate high performance, pulsed tokamak scenarios for next-generation devices	3	2.5	**C. Petty** S. Allen
IT-3	NTM Control for ITER	Provide the physics basis for controlling neoclassical tearing modes (NTMs) using localized electron cyclotron current drive (ECCD) in ITER	0	0	**R. La Haye** D. Humphreys
IT-4	RWM Control for ITER	Develop the techniques and physics basis for RWM stabilization in ITER with emphasis on feedback stabilization in low rotation, high β plasmas	6	5	**A. Garofalo** M. Okabayashi
SC-1	Pedestal Width Physics	Develop a predictive understanding of the transport processes that govern the pedestal width in H-mode plasmas	1	1	**T. Leonard** G. Staebler R. Groebner
		Thrust totals	24	21.5	
		Stability topical area	4	2.5	**E. Strait**
		Confinement topical area	5	3	**K. Burrell**
		Boundary topical area	4	3	**S. Allen**
		Heating and current drive topical area	2	0	**R. Prater**
		Total allocated days	39	30	
		Director’s reserve	1		
		Contingency	10		
		Available days	50		

The 10 run week experimental plan for 2007, summarized in Table III, consists of efforts in six thrust areas and four topical areas.

- **Thrust areas**

Thrust AT-1: Advanced Scenario Development (7 days). Experiments in this area will utilize the upgraded heating and current drive capabilities from the electron cyclotron system to extend scenarios suitable for steady-state operation toward the resistive time scale. Demonstration of electron heating from the upgraded fast wave system is also an important element of the plan. Experiments to explore scenarios with potential for operation at $\beta_N > 4$ are planned, as are experiments to optimize the bootstrap fraction of the present steady-state scenario by changes in the *q* profile. Development of the capability of controlling the current profile evolution during the current rise to facilitate reproducibility and testing of new target *q* profiles for high performance will be the focus of the control tool development. Finally, experiments that mimic the proposed ITER start-up scenario will be carried out to assess the current profile evolution and the suitability of this start-up for advanced scenario operation in ITER.

Thrust IT-1: ELM Control for ITER (7 days). The two focal areas of research for this thrust will be: 1) ELM suppression via resonant magnetic perturbations (RMPs), including the development of a physics basis for the ITER ELM control coil design, and 2) tests of the viability of obtaining QH-mode with co-dominant neutral beam injection. Both of these efforts will make heavy use of the new capability to vary the co- counter-beam balance and the high triangularity lower divertor pumping. Additional time (increased from 5 to 7 days) was allocated to the RMP based ELM suppression experiments based on the advice of the DIII-D PAC and urgent ITER design issues. A preliminary assessment of the ability to control ELMs via shallow pellet injection will be made in piggyback experiments using the new pellet dropper hardware.

Thrust IT-2: ITER Hybrid Scenarios (3 days). Experiments in 2007 will further characterize the hybrid scenario in the ITER-like regime (e.g., low Mach number and $T_e \approx T_i$). The dependence of transport on E×B shear and T_e/T_i ratio will be studied, and the mechanisms responsible for transport changes will be identified. In addition, the H-mode pedestal characteristics will be compared between DIII-D and AUG as a function of heating power and rotation to learn more about the role of the H-mode pedestal in the hybrid scenario.

Thrust IT-3: NTM Control for ITER (0 days). The focus of this thrust continues to be on validating the advantage of modulated ECCD for stabilization of neoclassical tearing modes (NTM). Two days originally assigned to Thrust IT-3 were deferred to support urgent ITER design issues in Thrusts IT-1 and IT-4. These experiments, aimed at stabilizing the 2/1 NTM, will be done in 2007 if time allows. Otherwise, they are deferred to 2008.

Thrust IT-4: RWM Control for ITER (6 days). The primary goal of this thrust has been to demonstrate sustained operation significantly above the free boundary limit with rotation well below the critical value for stabilization. Experiments in FY06 showed a significantly lower rotation threshold with counter-injection than previous work, which motivates a more careful assessment in FY07 of the rotational threshold and the detailed rotation profile effects on RWM stability. These experiments will contribute to the main goal of 2007, i.e. evaluating the synergy between active feedback and plasma rotation in the RWM stabilization process (Milestone 163). In addition, data that is important for the design of RWM control coils in ITER will be obtained, including initial comparisons of external and internal coils for RWM stabilization. Additional time (increased from 5 to 6 days) was allocated to Thrust IT-4 based on the advice of the DIII-D PAC and urgent ITER design issues.

Thrust SC-1: Pedestal Width Physics (1 day). The experimental day allocated to this thrust will examine the pedestal width dependence upon global beta in hybrid discharges. A second day in collaboration with Thrust IT-2 will examine the pedestal beta dependence in an ASDEX-Upgrade similar shape to test shape dependence. A ρ^* comparison with JET has been delayed until next year due to hardware difficulties at JET.

- ## Topical Science Areas

Stability Topical Area (4 days). In advancing basic MHD physics and stability control, the main focus this year will be on key stability issues for ITER. In addition, this area will continue to take responsibility for the development of general plasma control including error field correction and shape control. In 2007, experiments will be performed in the areas of disruption studies, fast ion physics, Alfvén eigenmodes, error fields, and advanced plasma control.

Confinement Topical Area (5 days). The overarching goal for this area is to develop a predictive understanding of transport. Experiments in 2007 will be performed in the areas of angular momentum transport, transport barrier physics and control (core and edge), electron thermal transport (high *k* turbulence) and turbulence characterization (zonal flows).

Boundary Topical Area (4 days). Most of the experiments in this area are focused on important ITER issues. These include: several carbon transport experiments with the DiMES, including mirror deposition tests and a porous plug injector to measure the photon efficiency of molecular bands in the divertor. Heat flux reduction experiments will focus on radiative divertor operation in hybrid mode. An air bake experiment to test the effectiveness of this technique for tritium removal is also proposed.

Heating and Current Drive Topical Area (2 days). The long-term objectives of the Heating and Current Drive Topical Science Area are to develop and validate predictive models of heating and current drive for the systems available on DIII-D (electron cyclotron, fast wave, and neutral beam power); to improve the quantitative understanding of the bootstrap current, both in the core and near the edge; and to improve our understanding of the evolution and stability of discharges with the current supported fully noninductively. Experiments in 2007 will concentrate on improving understanding of the coupling of fast waves to high performance plasmas like hybrid discharges and on validating the model for power lost to energetic beam ions.

Each of the efforts has a responsible leader and deputy leaders. The plans and goals for the various thrusts and topical science areas are detailed below.

1.1. RESEARCH THRUSTS FOR 2007

1.1.1. THRUST AT-1 — ADVANCED SCENARIO DEVELOPMENT (Leader: T.C. Luce Deputy: E.J. Doyle)

1.1.1.1. Mission: Find the ultimate potential of the tokamak as a steady-state magnetic confinement system.

1.1.1.2. Long-Term Goals: Demonstrate the feasibility, the physics basis, and the necessary control tools for steady-state, high fusion gain tokamak operation.

1.1.1.3. Importance and Urgency: Steady-state operation at $Q \geq 5$ is a primary objective of the ITER project. DIII-D can provide significant input on the necessary steps required for such operation in ITER as a result of the leadership role taken by DIII-D in this area. In addition, key elements of the ITER design that have a significant impact on steady-state operation will likely be finalized in the near future (e.g., divertor geometry, poloidal coil set, first wall material). DIII-D can play a key role in assessing the implications of these decisions.

1.1.1.4. Research Areas for 2007: The research in this area will focus on the following areas:

- Establishing high-performance fully noninductive operation to the resistive time scale.
- Demonstration of electron heating in the steady-state scenario with fast waves.
- Determining the optimal q profile for maximizing the bootstrap current fraction for steady-state operation.
- Searching for current profile configuration that combines favorable transport with stability properties sufficient to operate with $\beta_N > 4$.
- Developing a model-based target q profile controller.
- Testing the standard ITER start-up scenario and assessing the implications for conventional and advanced scenarios.

1.1.1.5. New Tools: Experiments in this area will utilize the upgraded capabilities in the electron cyclotron and fast wave systems. The counter-NBI capability commissioned last year will also be used in the exploration and the target q profile control experiments. Improvements to the MSE system should contribute to the control experiments and to the quality of the analysis for establishing the physics basis.

1.1.2. RESEARCH THRUST IT-1 — ELM CONTROL FOR ITER (Leader: M.E. Fenstermacher Deputy: T.C. Jernigan)

1.1.2.1. Mission: To develop techniques to control ELM particle and energy losses for ITER.

1.1.2.2. Near-Term Goals: 1) Extend the operating space and develop a detailed physics understanding of the processes responsible for ELM suppression by the application of $n = 3$ resonant magnetic perturbations (RMPs) and examine the effect of $n = 1$ RMPs on ELMs in DIII-D for comparison with JET results; 2) determine the maximum co-rotational torque possible while maintaining QH-mode edge condition.

1.1.2.3. Importance and Urgency of Research: One of the largest uncertainties in the design of ITER is its ability to withstand the effects of repetitive Type-I ELMs. In this respect, demonstrated ELM mitigation techniques are urgently required for ITER. DIII-D has pioneered the development of techniques that permit ELM-free operation with acceptable confinement. These techniques include QH-mode and active coil control. Because of the high leverage that these techniques may provide on ITER achieving its baseline goals, it is important to characterize the physics of these techniques and assess their applicability to ITER. In addition, any modifications to the ITER design that incorporate these techniques must be made during the ongoing ITER Design Review process, with decisions anticipated this year

1.1.2.4. Research Areas for 2007: The work will be organized around three ELM suppression/reduction techniques:

- **RMP ELM Suppression with the I-coil.** Establish the physics basis for stochastic boundary ELM control in ITER. Determine the role of collisionality, shape, perturbation spectrum, rotation, density and input power. Attempt to increase pedestal pressure in ELM-free discharges with $n = 3$ RMP. Test various I-coil and C-coil combinations to determine poloidal mode spectrum effects. Determine the degree of plasma flow screening of the RMP and compare observed changes in pedestal profiles with theoretical expectations. Examine the effect of $n = 1$ RMPs on ELM control in DIII-D for comparison with JET results. The results of these experiments are urgently needed for ITER.

- **QH-mode**. Establish whether the ELM-free QH-mode can be obtained with net co-current momentum injection to the core plasma by varying the co- vs counter-NBI balance. Explore the role of E_r and rotation as a function of beam balance and compare with JT-60U results. Expand QH-mode operating space to higher shaping, higher β, separation of triangularity and squareness effects, improved n_e control, and higher power, longer ECCD.

- **Pellet ELM Pacing.** The ELM frequency and size modification results, achieved with high frequency small pellet injection on AUG, will be tested on DIII-D in piggyback experiments. It should be possible to do these tests in plasmas with the ITER shape, collisionality and near zero central rotation.

1.1.2.5. New Tools: The experiments in this thrust will take advantage of the new lower divertor to assess the ability to suppress ELMs in a high triangularity configuration (similar to the ITER configuration) at low pedestal collisionality. In addition, the reorientation of the 210 degree beamline will allow detailed studies of the required level of counter rotation to access QH-mode edge conditions. Commissioning of the new pellet dropper hardware will allow initial tests of pellet ELM pacing in DIII-D.

1.1.3. THRUST IT-2 — ITER HYBRID SCENARIOS (Leader: C.C. Petty; Deputy: S.L. Allen)

1.1.3.1. Mission: Develop, assess, and qualify (to the extent possible) candidate high performance, pulsed tokamak scenarios for next-generation devices.

1.1.3.2. Long-Term Goals:

- Provide next generation devices with a robust, reliable, operating regime that offers the potential of a substantial increase in performance over the conventional, sawtoothing, ELMy H-mode regime.

- Develop a detailed physics understanding of the processes that lead to improved performance.

- Convince the worldwide community to adopt the hybrid scenario as the new benchmark in pulsed tokamak performance.

1.1.3.3. Importance and Urgency: Projections based on stationary scenarios developed in recent years on DIII-D and other devices suggests that these scenarios offer the potential of a significant enrichment of the ITER research program. To confirm these projections toward ITER, significant work is required to characterize the physics phenomena (in particular, the energy and poloidal flux transport) that distinguish this regime from the conventional ELMing H-mode regime. DIII-D is the recognized world leader in hybrid scenario development and is well equipped to address these physics issues.

1.1.3.4. Research Areas for 2007: The work in this area will be organized in two main areas:

- Validating the performance in reactor-like conditions with an emphasis placed on assessing performance in low rotation, $T_e/T_i \approx 1$ plasmas.

- Understanding the role of the H-mode pedestal in the hybrid scenario by comparing the pedestal characteristics as a function of heating power and rotation between DIII-D and AUG.

1.1.3.5. New Tools for 2007: Experiments in this area will take advantage of the increase in ECH power (from two to five gyrotrons) and pulse length (up to ten seconds) to increase the electron temperature and reduce the amount of angular momentum injection. In addition, a new plasma shape (the AUG shape) will be developed for hybrid plasma operation.

1.1.4. RESEARCH THRUST IT-3 — NTM CONTROL FOR ITER (Leader: R. La Haye, Deputy: D. Humphreys)

1.1.4.1. Mission: To provide the physics basis for controlling neoclassical tearing modes (NTMs) using localized electron cyclotron current drive (ECCD) in ITER.

1.1.4.2. Near-Term Goals: Validate physics models of the NTM stabilization process with regard to key ITER design constraints, such as the width of deposition relative to the island width and current drive modulation.

1.1.4.3. Importance and Urgency: The m=2/n=1 NTM is expected to pose the greatest danger to disruption-free operation on ITER. Because of design constraints related to the port geometry in ITER, the current drive deposition width of the present ECCD system is considerably wider than the minimum island width required for self-stabilization of the NTM. Research is needed to test theoretical predictions that modulation of the current drive in phase with the island will allow a significant reduction of the overall power requirements of the ECCD system to fully suppress the NTMs.

1.1.4.4. Research Areas for 2007: Planned experiments in this area will focus on quantifying the effect of modulation on the ECCD's ability to suppress the NTM as the current drive deposition width is systematically varied. Although no time is presently allocated to this work, it may be done if additional run time becomes available.

1.1.4.5. New Tools: The reorientation of the 210 degree beamline allows development of a target plasma with sufficiently low plasma rotation that the ECCD can be modulated in phase with the rotating island associated with the NTM. Additional ECCD power will also be utilized to test suppression in cases in which the ECCD deposition is broader than what is typically used on DIII-D. The new tool of real-time steerable mirrors will be brought into operation initially on two gyrotrons. A promising new method of I-coil entrainment for stopping the 2/1 NTM from locking to the static error field and or wall will be further investigated. The new oblique ECE diagnostic for real-time radial location and phase of the island O-point will be checked out as a new means of both alignment and gyrotron modulation.

1.1.5. RESEARCH THRUST IT-4 — RWM CONTROL FOR ITER (Leader: A. Garofalo, Deputy: M. Okayabashi)

1.1.5.1. Mission: To develop the techniques and physics basis for RWM stabilization in ITER with particular emphasis on feedback stabilization in low rotation, high β plasmas.

1.1.5.2. Near-Term Goals: 1) Demonstrate sustained feedback control of the $n = 1$ RWM; 2) assess synergistic effect of plasma rotation and feedback control on RWM stability; and 3) validate RWM models for application to ITER.

1.1.5.3. Importance and Urgency of Thrust: ITER steady-state scenario requires stabilization of the RWM for operation at its target $\beta_N \sim 3$, above the no-wall β_N stability limit ~2.5. Plasma rotation and magnetic feedback could stabilize the RWM up to the ideal-wall β_N limit ~5, allowing ITER experimental studies of scenarios approaching advanced tokamak reactor concepts, i.e. $\beta_N > 4$. Predicted plasma rotation in ITER with present design of neutral beam injection is marginal for RWM stabilization without an active feedback system. The present ITER design of external non-axisymmetric error field correction coils may not be sufficient for RWM feedback stabilization significantly above the no-wall stability limit. The DIII-D device, with external and internal control coils and the capability to vary the amount and profile of injected neutral beam torque, is uniquely suited to address reactor relevant RWM feedback and deliver the experimental results needed to benchmark codes and support ITER design modifications. The results of these experiments are urgently needed to contribute to ITER design decisions that will be made this year.

1.1.5.4. Research Areas for 2007: The research in this area will have three primary objectives:

- Benchmark RWM physics models for extrapolations to ITER. Clarify importance of various kinetic effects on RWM stabilization.
- Demonstrate feedback control of RWMs at low rotation, where rotation alone is not sufficient for stable operation.
- Establish bandwidth requirements of RWM coil system. This will inform the decision on where such coils must be placed (internal or external) on ITER.

1.1.5.5. New Tools: The recent upgrades to the neutral beam injection that allowed balanced torque input with up to 10 MW input power are still a relatively new tool. In

2007, experiments in this thrust will use, for the first time, balanced injection at high beta in reversed-I_p configuration, to explore the effect of different rotation profile shapes. In addition, RWM feedback experiments will be able to use twice as many audio amplifiers as in 2006, for operation of the I-coils at simultaneous high frequency and current.

1.1.6. THRUST SC-1 — PEDESTAL WIDTH PHYSICS (Leader: A.W. Leonard; Deputies: G.M. Staebler, R.J. Groebner)

1.1.6.1. Mission: Develop a predictive understanding of the transport processes that govern the pedestal width and height in H-mode plasmas.

1.1.6.2. Long-Term Goal: Utilize the DIII-D pedestal diagnostic set to both test and motivate theory-based and empirical models of particle, energy, and momentum transport in the edge region.

1.1.6.3. Importance and Urgency: Experiments from existing devices and simulations of ITER suggests the overall performance in ITER will be strongly dependent on the obtainable pedestal pressure. With confidence increasing that the maximum pressure gradient in the edge is set by the destabilization of coupled peeling-ballooning modes, the primary uncertainty now in predicting the pedestal pressure is the width of the transport barrier region in the edge. Because of the complexity in treating this edge region self-consistently, theoretical models of the processes in the edge are just now progressing to the point that experimental comparisons are possible.

1.1.6.4. Research Areas for 2007: Primary areas of activity in this area for 2007 will include:

- Initial comparisons of linear growth rates, computed with the TGLF code, to the ExB shearing rate in the pedestal.
- Preparation of previously obtained data for inclusion in the ITPA Pedestal Profile and Divertor databases.
- Studies of variation of pedestal structure with increasing heating power in hybrid and conventional H-mode discharges. This will be carried out via an experiment, which is a collaboration with ASDEX-Upgrade.
- Comparison of pedestal characteristics in DIII-D hybrid discharges with the characteristics of the improved H-mode regime in AUG. This will also be carried out in an experiment which is a collaboration with AUG.

- Determine the pedestal width dependence upon the ion-gyroradius through a collaborative experiment with JET.

1.2. PHYSICS TOPICAL AREAS

1.2.1. STABILITY (Leader: E.J. Strait)

1.2.1.1. Goals. The long-term objective of MHD stability research in DIII-D is to establish the scientific basis for understanding and predicting limits to macroscopic stability of toroidal plasmas. Complementing the more focused research carried out in the Research Thrusts, the role of the Stability Topical Science area is to provide a broad range of good MHD stability science, investigate instability control in regimes relevant to ITER and other burning plasmas, and explore stability physics in new regimes beyond the scope of the advanced tokamak program. In addition, the Stability Topical Science area is responsible for physics operation and development of plasma control.

1.2.1.2. Plans for 2007. Within the 10-week operating schedule for 2007, a total of 4 days have been allocated to the Stability Topical Science area. The emphasis of this year's experiments will be on key stability issues for ITER. Due to its importance to ITER and to the long-range development path for the tokamak, 1.5 days will be used for disruption studies. Two experiments will also be done on fast ion physics, including their influence on sawtooth stability and their interaction with Alfvén eigenmodes in reverse shear plasmas. The remaining half day will be used for optimizing the correction of global and local magnetic field errors. In addition, we expect to use occasional blocks of evening operation, following the normal experimental day, for plasma control development. The planned experiments are as follows:

1. **Disruption Mitigation**. The goal of this experiment is to validate models for gas jet delivery and mixing during disruption mitigation. The experiment will make use of a new multi-valve gas injection system that allows the gas throughput to be varied independently of other valve parameters. The scaling of impurity assimilation into the plasma during the thermal quench and current quench will be measured as a function of the gas species and injection rate, in order to evaluate the requirements for reaching Rosenbluth density threshold for suppression of the avalanche multiplication process. Disruption mitigation is a key issue for ITER, and this is a joint ITPA experiment with JET, C-Mod, JT-60U, and others.

2. **Sawtooth Stability Physics.** This experiment will investigate the sawtooth instability, in conditions where partial stabilization by fast ions (generated with neutral beam injection or ICRF heating) leads to large, long-period sawteeth. The full set of fluctuation diagnostics will be used to study the possible role of Alfvén eigenmodes as a triggering mechanism for the instability, and the impact on fast ion confinement will be measured with the D_α emission diagnostic. Stability

conditions will be varied by using electron cyclotron current drive to modify the local magnetic shear near the $q = 1$ surface. This experiment will provide data for comparison to the Porcelli sawtooth model, and will give initial information on control of giant sawteeth with localized current drive. The sawtooth instability may have an impact on ITER's fusion performance, and sawtooth control for mitigation of neoclassical tearing mode seeding is an ITPA joint experiment.

3. **Reverse Shear Alfvén Eigenmode Stability.** The goal of this experiment is to investigate the possible drive of core-localized Alfvén modes by thermal ions. In this experiment, the power and direction of neutral beam injection will be varied, in order to separate the effects of fast ions and thermal ions. The DIII-D fluctuation diagnostics will be used to measure these short-wavelength instabilities, and their impact on fast ion transport will be assessed. Thermal ion-driven Alfvén modes could have a significant impact on alpha particle confinement in ITER, and understanding these instabilities is an ITPA high priority research area.

4. **Optimization of Error Field Correction.** This experiment continues the ongoing effort to maximize DIII-D's performance by minimizing magnetic field errors. This experiment will fine-tune the standard error correction algorithms using the C-coil and the I-coil, develop I-coil error correction for plasmas with right-handed magnetic field (reversed toroidal field or reversed plasma current), and investigate local correction of a local, high-harmonic field error.

5. **Advanced Plasma Control.** This experiment will develop and test model-based multivariable control of the plasma shape and position, and demonstrate solutions to nonlinear operating limit problems. This is a key element to improving the accuracy and reliability of DIII-D shape control, and a first step toward simulating the ITER control system.

If additional time becomes available for a 12-week operating schedule, an additional half-day is anticipated for stability experiments. The use of this additional time will be decided later, based on results from the first four experiments.

1.2.2. CONFINEMENT AND TRANSPORT (Leader: K.H. Burrell)

The long-term goal of the confinement and transport topical science area is to develop a predictive understanding of transport. As part of this work, we investigate the fundamental transport physics issues that are raised by the DIII-D advanced tokamak research. In addition, as a topical science area, we have the responsibility to foster investigations of novel transport ideas and to develop new discoveries.

For the 2007 campaign, the focus areas for confinement and transport research are:

1. Rotation studies — especially intrinsic rotation.
2. Separating roles of ion temperature gradient (ITG) and trapped electron mode (TEM) turbulence on particle and energy transport.
3. Investigating short wavelength turbulence, electron temperature fluctuations and electron temperature gradient (ETG) modes.
4. Nondimensional scaling of turbulence and transport with beta.
5. Edge transport barrier physics — effect of co plus counter NBI on L-H transition.

The confinement and transport topical science area is divided into four working groups for the 2007 campaign: 1) shear and rotation control, 2) fundamental turbulence 3) core transport and 4) H-mode physics.

The scientific topic considered in the shear and rotation control experiments is basic rotation physics, especially the physics of the intrinsic rotation which occurs when there is no torque input into the plasma. The results will be compared with turbulence transport predictions from the GYRO code.

The scientific questions considered in the fundamental turbulence experiments are: 1) can we experimentally separate the effects of ion temperature gradient modes (ITG) and trapped electron modes (TEM)? 2) How do the electron temperature fluctuations vary with radius and do these agree with GYRO predictions? This latter experiment will exploit new diagnostic capabilities to measure the electron temperature fluctuations. In addition, in both experiments we will use our fluctuation diagnostics to study variations in plasma turbulence across a wide range of spatial scales ($1 \leq k \leq 35\ \mathrm{cm}^{-1}$).

In the core transport area, we will investigate the behavior of turbulence and transport as the plasma beta is varied, keeping all of the other nondimensional parameters fixed. Again, turbulence over a broad range of spatial scales will be measured. The results will be used to test the turbulence predictions from GYRO.

Finally, the H-mode physics area will investigate further the strong dependence of the L-H transition power threshold on the plasma rotation discovered last year. The key question to answer is whether this effect is truly due to rotation or whether direct ion orbit loss from the counter neutral beams plays the dominant role.

1.2.3. BOUNDARY PHYSICS (Leader: S.L. Allen)

1.2.3.1. Goals. The long-term objective of boundary physics area is to establish the scientific basis for reactor designs capable of handling the high heat and particle fluxes from a reactor core plasma while maintaining the integrity of the plasma facing components. In the near-term, this program is focused on assessing the ability to reduce the short-term and long-term retention of tritium in plasma facing surfaces, assessing the ability to control plasma density by pumping the outer divertor legs of a double null plasma, and demonstrating the compatibility of highly radiative fractions with good plasma performance. This area is also focused on comparing computational models such as UEDGE and OEDGE with plasma data so that plasma conditions on future machines can be estimated.

1.2.3.2. Plans for 2007. The Boundary Physics experimental program for 2006 is organized into working groups. These working groups are:

- Plasma surface interactions
- Transport and ELMs
- Heat flux control and fueling.

Within the 10-week operating schedule for 2007, a total of 4 days have been allocated to the boundary physics area. Carbon transport and tritium retention are important, ITER-relevant research topics and are the highest priority. This year the Boundary TSA will also carry out an oxygen (probably diluted to below 25% partial pressure by helium or dry air) bake experiment to demonstrate removal of ^{13}C as a surrogate for co-deposited tritium. These experiments are being planned with input from the ITER team by way of the ITPA and the USBPO. The University of Toronto is performing "side-lab" experiments to determine the process parameters of the air bake. Sandia and other labs will carry out the analysis of the tiles after they have been processed with the air bake. Experiments to study techniques for reducing divertor heat flux in high performance plasmas such as hybrid operation will receive 1 day of run time; these are "puff and pump" experiments that are carried out in both forward and reverse direction of the toroidal field. The remaining time will be used for studies of various aspects of erosion/redeposition of plasma facing surfaces, such as DiMES exposures and a novel "porous plug" injector to determine the photon efficiency of molecular carbon emission in the divertor. The porous plug experiment will completed the thesis research of a University of Toronto student.

1.2.4. HEATING AND CURRENT DRIVE PHYSICS (Leader: R. Prater)

The objectives of the Heating and Current Drive Topical Science Area are: (1) to develop and validate predictive models of heating and current drive for the systems available on DIII-D: electron cyclotron, fast wave, and neutral beam power; (2) to improve the quantitative understanding of the bootstrap current; and (3) to improve our understanding of the long-term evolution and stability of discharges with the current supported fully noninductively.

In pursuance of these goals and in view of the program guidance that the key priority is to validate the use of fast wave power in high performance discharges for control of the central current density, the two day's experiment time allocated to heating and current drive will be devoted to development of fast wave current drive. One day will be spent on a comparison with computational models of how absorption of fast waves is split by electron Landau damping, ion cyclotron damping, and damping on energetic beam ions. Through work in a beneficial collaboration with the RF SciDAC group, successively more sophisticated models are being developed and applied to past discharges. This comparison motivates and focuses experimental questions; for example, what is the role of a small minority of H in a D plasma. Absorption of waves by ions represents power lost from the main mission of driving an electron current. The second day's experiment addresses how effectively fast wave power can be coupled to a plasma with an ELMing H-mode edge. This is a key topic because success at FWCD near the plasma axis is dependent on actually coupling high power to the plasma, even if the current drive physics is beneficial. The fast wave is evanescent outside the plasma, so high power can be coupled to the plasma only by minimizing the size of the gap between the plasma and the antenna and by operating the antenna at high voltage. For routine operation of the FWCD system in high performance discharges both of these approaches must be followed. Experiments are needed to see how successful this can be. High power electron cyclotron heating can be used to vary the electron beta and therefore the absorption on electrons.

These two experiments benefit enormously from advances in diagnostics. Specifically, the fast ion D_α (FIDA) array, which uses the Doppler shift of charge exchange emission to develop information on the fast ion velocity distribution, provides a valuable point of comparison with theory. Also, the reversed neutral beam provides better information from the motional Stark effect and charge exchange recombination diagnostics for equilibrium reconstruction and determination of the radial electric field.

If the experiment time allocation in 2007 should be increased or in 2008, further issues may be explored. First would be validation of the models for neutral beam heating and current drive, which would be greatly facilitated by the counter-NBI. Second, a key need for validating the computational model for electron cyclotron current drive (ECCD) is to measure ECCD in the temperature range needed for a burning plasma experiment. Electron temperatures above 15 keV can be generated in DIII-D by applying ECH power near the plasma center at low density. The effects of modestly nonthermal electron distribution functions and the action of transport on the distribution function will be studied for comparison with the calculations of the Fokker-Planck code CQL3D.

1.2.4.1. Tools for 2007.

- Electron cyclotron heating systems
  - 4 CPI gyrotrons that generate a nominal 1 MW for pulses up to 10 s
  - 1 CPI depressed collector gyrotron at 1.3 MW for 10 s may be operable
  - All ECH systems have fully steerable launchers
- Neutral beam injection systems
  - 5 NBI sources oriented to drive co-current
  - 2 NBI sources oriented to drive counter-current
- Fast wave systems
  - FMIT transmitter for 60 MHz operation with refurbished antenna
  - One ABB transmitter with a new high-power EIMAC tetrode and one ABB transmitter with the old tetrode, each operating near 90 MHz.
  - Four-strap antennas for each transmitter

1.3. RESEARCH PROPOSALS RECEIVED

A detailed list of research proposals received during the 2005 ROF is given in Appendix A. These proposals formed the basis for the 2006 and 2007 campaigns.

1.4. DETAILED LIST OF SCHEDULED EXPERIMENTS

Table V lists the experiments scheduled during the 2007 experimental campaign.

Table V
Detailed list of scheduled experiments for the 2007 Experiment Campaign

Date	Experiment Name	Area	Leader
2/2/07	Pre-boronization high performance (1/2 day)	Boundary	West
2/2/07	Error field correction (1/2 day)	Stability	Schaffer
2/6/07	RWM stability vs plasma rotation, day 1: normal I_p (1/2 day)	IT-4	Reimerdes
2/6/07	Resonant vs non-resonant braking, day 1: normal I_p (1/2 day)	IT-4	Garofalo
2/7/07	Expanding hybrid scenario at low rotation plasmas	IT-2	Petty
2/8/07	Mode spectrum dependence of ELM control	IT-1	Evans
2/9/07	Contingency		
2/12/07	RWM stability vs plasma rotation, day 2: reversed I_p (1/2 day)	IT-4	Reimerdes
2/12/07	Resonant vs non-resonant braking, day 2: reversed I_p (1/2 day)	IT-4	Garofalo
2/13/07	Transition from DECF to feedback	IT-4	Okabayashi
2/14/07	Contingency		
2/15/07	ITER start-up scenario testing	AT-1	Luce
2/16/07	Contingency		
3/26/07	Role of the pedestal region on global confinement in hybrid and conventional H-modes - Day 1	SC-1	Maggi
3/27/07	Disruption mitigation with medusa valve	Stability	Hollmann
3/27/07	Heat flux reduction normal B_T (1/2 day)	Boundary	Petrie
3/28/07	Role of the pedestal region on global confinement in hybrid and conventional H-modes - Day 2	IT-2	Maggi
3/29/07	Feedback control of ELM-driven RWMs	IT-4	Okabayashi
3/30/07	Contingency		
4/2/07	Measure FW absorption by fast ions and electrons	H&CD	Prater
4/3/07	Rotation dependence of RMP ELM control	IT-1	Fenstermacher
4/4/07	Fast wave coupling, power handling, and current drive in hybrid discharges	H&CD	Prater
4/5/07	Beta scaling	Transport	Petty
4/6/07	Contingency		
4/9/07	Rotation dependence of QH-mode	IT-1	Burrell
4/10/07	Reverse shear Alfvén eigenmode stability	Stability	Nazikian
4/11/07	Contingency		TBD
4/12/07	Advanced RWM feedback algorithms	IT-4	Garofalo
4/13/07	Additional RMP ELM control experiment	IT-1	Fenstermacher
6/1/07	Heat flux reduction reversed B_T (1/2 day)	Boundary	Petrie
6/4/07	RMP ELM control experiment	IT-1	Fenstermacher
6/5/07	n=1 or n=2 RMP for ELM control	IT-1	Buttery
6/6/07	First measurement of radial profiles of electron temperature and density turbulence and direct comparison to nonlinear gyrokinetic simulations	Transport	White
6/7/07	Extend steady-state scenario to 2 τ_R	AT-1	Luce
6/8/07	Contingency		TBD
6/11/07	Demonstrate FW electron heating in steady-state scenario	AT-1	Luce
6/12/07	Pedestal particle transport during RMP ELM control	IT-1	Moyer
6/13/07	Erosion/redeposition with carbon day 1 (1/2 day)	Boundary	McLean
6/13/07	Disruption mitigation with medusa valve	Stability	Hollmann
6/14/07	Erosion/redeposition with carbon day 2 (1/2 day)	Boundary	McLean
6/14/07	Disruption mitigation with medusa valve	Stability	Hollmann

6/15/07	Contingency		
7/9/07	Dependence on T_i=T_e at low collisionality	IT-2	Doyle
7/10/07	Target q profile control development	AT-1	Luce
7/11/07	Intrinsic rotation and modulated momentum transport	Transport	deGrassie
7/12/07	Bootstrap current optimization (higher q_{min})	AT-1	Luce
7/13/07	Contingency		
7/16/07	H-mode power threshold as a function of input torque	Transport	Gohil
7/17/07	Additional RWM control experiment	IT-4	Garofalo
7/18/07	Exploration of β_N > 4 day 1	AT-1	Luce
7/19/07	Discriminate between effects of ITG and TEM turbulence	Transport	DeBoo
7/20/07	Contingency		TBD
7/23/07	Stability of giant sawteeth	Stability	Heidbrink
7/24/07	Exploration of β_N > 4 day 2	AT-1	Luce
7/25/07	Director's reserve		
7/26/07	Contingency		
7/27/07	Oxygen bake day 1	Boundary	Allen

1.5. THE 2007 OPERATIONS SCHEDULE

The operations schedule is designed for efficient and safe use of the DIII-D facility. Ten calendar weeks of plasma physics operations is scheduled for the fiscal year 2007. The plan is to have alternating 2- and 3-week run periods. The operations schedule is shown in Fig. 1. Operations are carried out 5 days per week for 8.5 hours. The 2007 operations schedule can be viewed at http://d3dnff.gat.com/Schedules/fy2007Sch.htm.

In addition to operating the tokamak, maintenance has to be performed and new hardware is being installed to enhance DIII-D capabilities. The schedule for these activities is for the maintenance to be done when the tokamak is not operating.

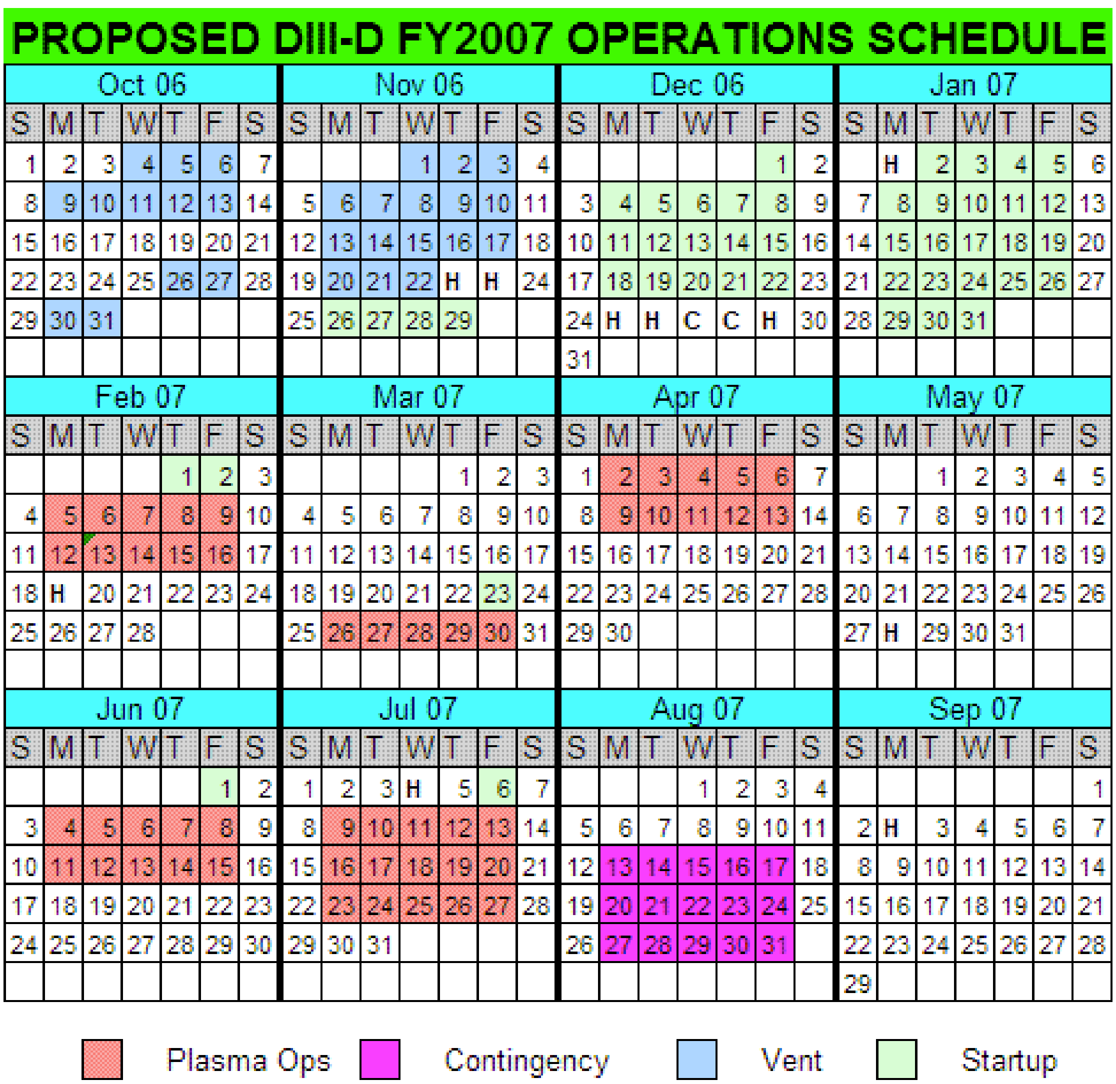

Fig. 1. DIII–D master schedule FY2007 (10-week plan).

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APPENDIX A
RESEARCH PROPOSALS RECEIVED

ID#	Name	Affiliation	Title	Research Area
542	M.R. Wade	GA	Effect of loop voltage on the L-H transition	Transport and confinement
543	M.E. Fenstermacher	LLNL	ITER proof-of-principle ELM suppression by RMP	ELM control for ITER
544	M.E. Fenstermacher	LLNL	Re-establish low ν* ELM suppression in high triangularity LSN	ELM control for ITER
545	M.E. Fenstermacher	LLNL	ITER shape low ν* ELM suppression in high triangularity near DN	ELM control for ITER
547	N.H. Brooks	GA	Study of fragmentation chemistry using porous plug to inject hydrocarbons into divertor strikepoint	Boundary
548	M.E. Fenstermacher	LLNL	Higher density low ν* ELM suppression in high triangularity LSN	ELM control for ITER
549	M.E. Fenstermacher	LLNL	Low rotation low ν* ELM suppression in LSN shape	ELM control for ITER
550	R.J. Buttery	UKAEA Culham	Sawtooth and NTM control with ECCD	NTM control for ITER
551	R.J. Buttery	UKAEA Culham	NTM thresholds with ITER relevant rotation	Stability and control
552	J.S. deGrassie	GA	Dimensionless similarity experiments on intrinsic toroidal rotation	Transport and confinement
553	J.S. deGrassie	GA	Intrinsic rotation determination via near balanced NBI	Transport and confinement
554	E. Fredrickson	PPPL	Aspect ratio and ρ* scaling of NTMs between NSTX and DIII-D	Stability and control
555	J.S. deGrassie	GA	Toroidal momentum confinement scaling with NBI torque	Transport and confinement
556	J.S. deGrassie	GA	Effect of magnetic error fields upon toroidal momentum confinement	Transport and confinement
557	J.S. deGrassie	GA	Co-QH-Mode with passing fast ions?	Stability and control
558	M.E. Fenstermacher	LLNL	ELM Modification by Pellet Pacing	ELM control for ITER
559	M.E. Fenstermacher	LLNL	Pellet Pacing of ELMs in RMP ELM suppression Discharges	ELM control for ITER
560	M.E. Fenstermacher	LLNL	QH-mode with co- core rotation	ELM control for ITER
561	J.S. deGrassie	GA	Is QH-Mode more robust with H beam injection?	Stability and control
562	M.E. Fenstermacher	LLNL	Pellet pacing of ELMs in QH-mode discharges	ELM control for ITER

ID#	Name	Affiliation	Title	Research Area
563	J.S. deGrassie	GA	What fraction of NBI must be counter to obtain QH-mode?	ELM control for ITER
564	M.E. Fenstermacher	LLNL	High performance QH-mode with counter I_p	ELM control for ITER
565	W.W. Heidbrink	UC Irvine	Fast-ion transport by TAEs	Stability and control
566	C.C. Petty	GA	Sustained monster sawteeth	Stability and control
567	C.C. Petty	GA	Sustainment of high Li with central current drive	Advanced scenario development
568	C.C. Petty	GA	Higher beta with high q_{min} using pressure profile control	Advanced scenario development
569	C.C. Petty	GA	Simulation of alpha channeling current drive	Heating and current drive
570	W.W. Heidbrink	UC Irvine	Compressional Alfvén eigenmode stability	Stability and control
571	G. Taylor	PPPL	EBW mode conversion and current drive	Heating and current drive
572	G. Taylor	PPPL	Efficient off-axis current drive at high density	Advanced scenario development
573	C.C. Petty	GA	Checkout of rotated beam sources using co-injection	Heating and current drive
574	W.W. Heidbrink	UC Irvine	Monster sawteeth that never crash	Advanced scenario development
575	W.W. Heidbrink	UC Irvine	Diagnose monster sawteeth	Stability and control
576	W.W. Heidbrink	UC Irvine	Neutral beam profile in MHD-quiescent plasmas	Heating and current drive
577	W.W. Heidbrink	UC Irvine	Doppler shift of the ion cyclotron resonance	Heating and current drive
578	C.C. Petty	GA	Oscillating fluxes current drive	Heating and current drive
579	M.E. Fenstermacher	LLNL	Private flux dome vs no dome for ITER decision	Boundary
580	J.C. DeBoo	GA	Characterize turbulence in a TEM dominated discharge	Transport and confinement
581	J.C. DeBoo	GA	Ion transport studies using electron heat pulses	Transport and confinement
582	C.C. Petty	GA	Separating rotational shear and ρ* scaling effects on transport	Transport and confinement
583	C.C. Petty	GA	ITB physics: rotation and T_i/T_e	Transport and confinement
584	C.C. Petty	GA	High performance operation with $T_e = T_i$	Advanced scenario development

ID#	Name	Affiliation	Title	Research Area
585	C.C. Petty	GA	Fast wave damping on ions and electrons	Advanced scenario development
586	C.C. Petty	GA	Modulation of bootstrap current	Heating and current drive
587	C.C. Petty	GA	Electron heat pinch	Transport and confinement
588	T.W. Petrie	GA	Is the radiative divertor concept compatible with double-null H-mode operation?	Boundary
589	T.W. Petrie	GA	Can injected impurities be screened effectively during ELM suppression in a standard H-mode plasma?	ELM control for ITER
590	T.W. Petrie	GA	Is the radiating divertor scenario compatible with ELM suppression?	ELM control for ITER
591	T.W. Petrie	GA	Divertor plasma behavior with and without a dome	Boundary
592	T.W. Petrie	GA	Optimal fueling location for pumped DN plasmas: high-field side vs low-field side	Boundary
593	T.W. Petrie	GA	Characterizing particle exhaust in double-null and near-DN using the new pumping configuration	Boundary
594	T.W. Petrie	GA	Can heat flux outside the slot divertor be reduced?	Boundary
595	T.W. Petrie	GA	Compatibility of the radiative divertor concept with high performance ("AT") operation	Advanced scenario development
596	T.W. Petrie	GA	Compatibility of ELM suppression with a radiating divertor scenario in the hybrid H-mode	ITER hybrid scenarios
597	M. Van Zeeland	GA/ORISE	Role of $\nabla(P)$ on RSAE and a diagnostic opportunity for ITER	Stability and control
598	M. Van Zeeland	GA/ORISE	Alfvén eigenmodes driven by I-coil	Stability and control
599	M. Van Zeeland	GA/ORISE	Actively driven beta-induced (BAE) and reverse-shear (RSAE) Alfvén eigenmodes using the I-coils	Stability and control
600	C.C. Petty	GA	Electron transport in ITB plasmas	Transport and confinement
601	C.C. Petty	GA	ECCD in high beta poloidal plasmas	Heating and current drive
602	C.C. Petty	GA	ECCD at high electron temperature	Heating and current drive
603	C.C. Petty	GA	Dependence of stiffness on elongation	Transport and confinement
604	C.P.C. Wong	GA	Material exposure at DiMES and MiMES locations and at different temperatures, with ELM-free H-mode	Boundary

ID#	Name	Affiliation	Title	Research Area
605	R. Nazikian	PPPL	Excitation of high-n Alfvén eigenmodes and the role of co/counter NBI	Stability and control
606	R. Nazikian	PPPL	4/3 and 3/2 NTM redistribution of beam driven current in Hybrid plasmas	ITER hybrid scenarios
607	R. Nazikian	PPPL	Role of ExB shear at integer q_{min} ITB formation events in L-mode plasma	Transport and confinement
608	R. Nazikian	PPPL	Documentation of fluctuations vs ExB shear and T_i/T_e in low power L-mode plasma	Transport and confinement
609	R. Nazikian	PPPL	Spontaneous screening of RMP in balanced L-mode and effect on the L-H transition	Transport and confinement
610	R. Nazikian	PPPL	Turbulence spreading in DIII-D reverse shear plasmas	Transport and confinement
611	R. Nazikian	PPPL	Off-axis beam driven current using Alfvén eigenmodes	Advanced scenario development
612	T.W. Petrie	GA	The effect of divertor SOL flux expansion on ELM pulse intensity	Boundary
613	J.S. deGrassie	GA	Are standard QH-mode and RMP ELM-suppression symbiotic or incompatible?	ELM control for ITER
614	M. Walker	GA	Implement and commission advanced controllers for operational use	Stability and control
615	C.C. Petty	GA	Extreme off-axis ECCD	Heating and current drive
616	C.C. Petty	GA	Direct measurement of ECCD width from modulated ECCD	Heating and current drive
617	J. Jayakumar	LLNL	Measurement of change in edge current during ELM	Pedestal width physics
618	J. Jayakumar	LLNL	Effect of rotation on hybrid discharges	ITER hybrid scenarios
619	J. Jayakumar	LLNL	Change in current profile evolution with counter beam substitution	ITER hybrid scenarios
620	J. Jayakumar	LLNL	Hybrid scenario in QH-mode	ELM control for ITER
621	J. Jayakumar	LLNL	ITER-like startup of hybrid discharge in DIII-D	ITER hybrid scenarios
622	R. Bravenec	U. Texas	Modeling of the DIII-D BES diagnostic and application to GYRO simulations	Transport and confinement
623	C.C. Petty	GA	Effect of poloidal currents on stability limit	Advanced scenario development
624	J. Jayakumar	LLNL	Measurement of MHD mode profile using MSE, ECE and CER data	RWM control for ITER
625	C.C. Petty	GA	Measurement of inductive poloidal current	Heating and current drive

ID#	Name	Affiliation	Title	Research Area
626	R. Groebner	GA	Measurement of pedestal transport coefficients	Pedestal width physics
627	C.C. Petty	GA	Neutral beam current drive profile	Heating and current drive
628	R.J. Buttery	UKAEA Culham	Error field scaling to ITER at high beta	Stability and control
629	M.R. Wade	GA	Feedback control of plasma rotation	Transport and confinement
630	M.R. Wade	GA	Finding the optimum current profile for AT operation	Advanced scenario development
631	J.C. DeBoo	GA	Characterize ion ITBs in QH-mode discharges	Transport and confinement
632	J. Jayakumar	LLNL	Hybrid discharges at high plasma current, high toroidal field and moderate density	ITER hybrid scenarios
633	J. Jayakumar	LLNL	β_N=5 demonstration in steady state relevant conditions	Advanced scenario development
634	J. Jayakumar	LLNL	ELM modification in hybrid discharges	ELM control for ITER
635	R. Prater	GA	Effect of transport on profile of ECCD	Heating and current drive
636	N.H. Brooks	GA	^{13}C tracer injection into DIII-D plasmas, with the vessel wall hot	Boundary
637	R. Prater	GA	Generation of radial electric fields during ECH	Heating and current drive
638	C.C. Petty	GA	Well-aligned current drive for sustaining high q_{min}	Advanced scenario development
639	P. Gohil	GA	Real time control of plasma rotation for RWM feedback control	RWM control for ITER
640	C.C. Petty	GA	Dependence of NTM suppression on ECCD width	NTM control for ITER
641	C.C. Petty	GA	Varying width of modulated ECCD using $N_{\parallel}$	NTM control for ITER
642	R.J. Buttery	UKAEA Culham	Cross machine hybrid scenario β limit scaling with ρ^* and rotation	ITER hybrid scenarios
643	J.P.H.E Ongena	ERM-KMS, Lab Plasmaphysics	Stationary feedback controlled Ar seeded H-Mode plasmas with reduced wall loading	Boundary
644	M. Peng	ORNL	NBI driven momentum transport study	Transport and confinement
645	P. Gohil	GA	Electron ITBs with low plasma rotation	Transport and confinement
646	R. Prater	GA	ECH antenna checkout	Heating and current drive
647	J. Kinsey	Lehigh U.	Elongation effects in H-mode plasmas with balanced NBI	Transport and confinement
648	R. Prater	GA	Verify performance of real-time steerable ECH antennas	Heating and current drive

ID#	Name	Affiliation	Title	Research Area
649	R. Prater	GA	Measure profile of ECCD in the presence of magnetic islands	Heating and current drive
650	T.A. Casper	LLNL	Modification of particle transport using slow EC-induced transition under ITB conditions	Transport and confinement
651	R. Prater	GA	Test performance of counter neutral beam	Heating and current drive
652	P. Gohil	GA	Effect of plasma rotation on QH-mode plasmas	ELM control for ITER
653	J. Jayakumar	LLNL	Quantifying beam diffusion in a plasma	Advanced scenario development
654	C.C. Petty	GA	Beta above no wall limit with ECCD suppression of 2/1 NTM	NTM control for ITER
655	W.R. Wampler	SNL	Carbon erosion with argon detached plasmas	Boundary
656	P. Gohil	GA	Dependence of ITB formation requirements on plasma rotation	Transport and confinement
657	D.P. Brennan	GA/ORISE	Detection of driven kinetic Alfvén waves in hybrid discharges	ITER hybrid scenarios
658	P. Gohil	GA	Double barrier plasmas using ELM pacing pellets	ELM control for ITER
659	R. Maingi	ORNL	Dependence of ELM size and structure on toroidal rotation	ELM control for ITER
660	C.C. Petty	GA	Measuring the structure of tearing modes	Stability and control
661	R. Prater	GA	Demonstrate effect of edge heating by ECH on ELM frequency	Stability and control
662	R. Prater	GA	Startup assist using second harmonic ECH	Heating and current drive
663	F.W. Perkins	GA	Formation and control of locked neoclassical tearing modes	NTM control for ITER
664	C.C. Petty	GA	Collisionality scans at fixed n/n_{limit}	Transport and confinement
665	J. Kinsey	Lehigh U.	Shafranov shift stabilization in H-mode discharges with balanced NBI	Transport and confinement
666	F.W. Perkins	GA	Operation of fast wave antennas with stochastic edge suppression of ELMs	Heating and current drive
667	P. Gohil	GA	Affecting changes in ELM characteristics through plasma rotation	ELM control for ITER
668	T.C. Hender	UKAEA Culham	RWM critical rotation in the ITER-AT type regime	RWM control for ITER
670	M. Bécoulet	CEA Cadarache	Double barrier plasmas with edge controlled by I-coils (the same as 669)	ELM control for ITER
671	M. Bécoulet	CEA Cadarache	Compatibility of ELM control by I-coils with fuelling by pellets.	ELM Control for ITER
672	S.M. Kaye	PPPL	DIII-D/NSTX ELM mitigation similarity experiment	ELM control for ITER

ID#	Name	Affiliation	Title	Research Area
673	S.M. Kaye	PPPL	Aspect ratio scaling	Transport and confinement
674	R. Maingi	ORNL	Dependence of pedestal structure on aspect ratio	Pedestal width physics
675	T.S. Hahm	PPPL	Measurements of turbulence spreading from ITB destruction	Transport and confinement
676	P.T. Lang	IPP Garching	ELM triggering by pellets for intensity control and physics investigation	ELM control for ITER
677	D.J. Schlossberg	U. Wisc., Madison	Effects of varying rotation (shear) and power injection on turbulence dynamics at the L-H transition	Transport and confinement
678	G.P. Maddison	UKAEA Culham	Pedestal width analysis by edge dimensionless identity experiments on DIII-D, C-Mod, JET and AUG	Pedestal width physics
679	V. Parail	UKAEA Culham	Power dependence of ELM frequency in RMP experiment	ELM control for ITER
680	G.J. Kramer	PPPL	Controlling q(0) with ellipticity induced Alfvén eigenmodes in DIII-D	Advanced scenario development
681	G.J. Kramer	PPPL	The effect of plasma rotation on core-localized Alfvén eigenmodes	Advanced scenario development
682	K.W. Krieger	IPP Garching	Measurement of deuterium and carbon deposition in gaps of plasma facing structures	Boundary
683	M.R. Wade	GA	Low squareness, high beta discharges	Advanced scenario development
684	R. Groebner	GA	Modulated transport in pedestal from MTEs	Pedestal width physics
685	P. Gohil	GA	Real time control of q in RMP experiments	ELM control for ITER
686	C.C. Petty	GA	Mach number scan with similar parameters as JT-60U	Transport and confinement
687	G.J. Kramer	PPPL	Stabilization of giant sawteeth by modifying the q-profile	Stability and control
688	C.C. Petty	GA	Aspect ratio scaling with MAST	Transport and confinement
689	M. Bakhtiari	U. Wisc., Madison	Fast plasma shutdown using gas-mixture injection	Stability and control
690	V. Parail	UKAEA Culham	Dependence on the level of gas puffing of the ELM frequency in RMP experiment	ELM control for ITER
691	M.R. Wade	GA	Hybrid scenario in the ITER shape	ITER hybrid scenarios
692	R. Maingi	ORNL	Compare pumping efficiency of DN, LSN, and USN plasmas	Boundary

ID#	Name	Affiliation	Title	Research Area
693	R.J La Haye	GA	Slowly rotating target plasma for modulated ECCD stabilization of NTMs	NTM control for ITER
694	M.R. Wade	GA	High absolute performance hybrid discharges	ITER hybrid scenarios
695	M.R. Wade	GA	T_e=T_i AT target development	Advanced scenario development
696	M.R. Wade	GA	Impurity and particle transport in hybrid scenarios	ITER hybrid scenarios
697	C. Lasnier	LLNL	Role of RSAEs in_ heat load _on _upper divertor baffle	Stability and control
698	L.R. Baylor	ORNL	Test of pellet dropper for ELM triggering	ELM control for ITER
699	L.R. Baylor	ORNL	Test of ELM suppression with a stochastic boundary and pellet injection	ELM control for ITER
700	J. Terry	MIT	C-Mod/DIII-D ELM comparison	ELM control for ITER
701	L.R. Baylor	ORNL	Scaling of HFS pellet mass drift and comparison with theory	Boundary
702	L.R. Baylor	ORNL	Test of pellet injection compatibility with ECCD NTM suppression	NTM control for ITER
703	C. Lasnier	LLNL	The role of stochasticity and fast ion orbit loss in QH mode boundaries	ELM control for ITER
704	W.M. Stacey	Georgia Institute of Technology	Pedestal structure measurements before and after L-H transition	Pedestal width physics
705	R.J. La Haye	GA	Test modulated ECCD for improved effectiveness of NTM stabilization	NTM control for ITER
706	A.W. Leonard	GA	Grassy ELM comparison with JT-60U	ELM control for ITER
707	J. Ferron	GA	Complete development of q feedback control during discharge formation	Advanced scenario development
708	V. Parail	UKAEA Culham	Detailed study of ELM suppression efficiency as a function of the amplitude of a current in I-coils	ELM control for ITER
709	R.I. Pinsker	GA	ICRF-assisted startup experiment at DIII-D for KSTAR	Heating and current drive
710	P. Gohil	GA	Integrated real time control of q and pressure profiles for steady state plasmas	Advanced scenario development
711	J.A. Boedo	UCSD	ELM nonlinear behavior	Boundary
712	J.A. Boedo	UCSD	ELMs and plasma rotation	Boundary
713	J.A. Boedo	UCSD	Turbulence asymmetires	Boundary
714	J.A. Boedo	UCSD	Turbulence asymmetries and plasma flow in the SOL	Boundary
717	L. Zeng	UCLA	Formation and radial propagation of ELM filament structure in DIII-D	Boundary

ID#	Name	Affiliation	Title	Research Area
718	W.P. West	GA	The effect of a private flux dome on divertor detachment, core density and the H-L transition	Boundary
719	A.W. Leonard	GA	Pedestal pressure dependence upon global beta at different shaping	Stability and control
720	W.P. West	GA	QH mode stability and E_r studies in balanced double null discharges	ELM control for ITER
721	W.P. West	GA	Inducement of EHO using high frequency I-coil	ELM control for ITER
722	M.R. Wade	GA	NTM seeding by ELMs at $q_{95} = 3$	Stability and control
723	M.R. Wade	GA	Inferrence of edge transport properties from fast CER data during ELM cycle	Pedestal width physics
724	M.R. Wade	GA	Using ECE to determine island location and ECCD deposition	NTM control for ITER
725	M.R. Wade	GA	Fast CER data during EQ transition in low collisionality RMP discharges	ELM control for ITER
726	A.W. Leonard	GA	Pedestal width dependence on ∇B direction	Pedestal width physics
727	C. Maggi	IPP Garching	Role of pedestal on global confinement in hybrid vs conventional H-modes: DIII-D and AUG comparison	ITER hybrid scenarios
728	F. Ryter	IPP Garching	Beta dependence of electron heat transport in ECH heated L and H plasmas	Transport and confinement
729	L.A. Berry	ORNL	Validation/tests of computer RF analysis tools from the RF SciDAC	Advanced scenario development
730	W.M. Stacey	Georgia Institute of Technology	Toroidal and poloidal rotation measurements	Transport and confinement
731	G.J. Kramer	PPPL	Identify the role of beam direction on current profile evolution due to RSAEs	Stability and control
732	S. Bernabei	PPPL	TAE-induced fast ion transport during sawtooth stabilization experiments.	Advanced scenario development
733	A. McLean	U. Toronto	Spectroscopic characterization of CH_4, C_2H_4, and H_2 in attached and detached divertor plasmas	Boundary
734	A. Litnovsky	Forschungszentrum Juelich	Investigations of ITER-like castellated structures in DIII-D: carbon migration and fuel accumulation	Boundary
735	Andrey Litnovsky	Forschungszentrum Juelich	ITER mirror test. Exposures of diagnostic mirrors in the divertor and in the midplane locations	Boundary
736	S. Bernabei	PPPL	Stabilization of giant sawteeth by controlling the q-profile	Stability and control

ID#	Name	Affiliation	Title	Research Area
737	S. Bernabei	PPPL	Stabilization of giant sawteeth through reduction of fast particle pressure gradient	Stability and control
738	B. Unterberg	Forschungszentrum Juelich	Influence of magnetic topology on transport in the stochastic loss layer during ELM suppression	ELM control for ITER
739	R. Koslowski	Forschungszentrum Juelich	Dependence of error field mode threshold on plasma rotation	Stability and control
740	R.J. La Haye	GA	Real-time mirror steering of ECCD for NTM control	NTM control for ITER
741	R. Groebner	GA	Turbulence at pedestal-core interface	Pedestal width physics
742	R.J. La Haye	GA	ECCD stabilization of 2/1 NTM in q_{95}>~3 ITER baseline scenario	NTM control for ITER
743	R. Groebner	GA	Test of theory of neoclassical pedestal	Pedestal width physics
744	M.R. Wade	GA	Long pulse (~10 s), $T_e = T_i$ hybrid discharges	ITER hybrid scenarios
745	M. Groth	LLNL	Toroidal distribution of CD and C_2 emission and chemical sputtering in DIII-D	Boundary
746	A.W. Leonard	GA	Pedestal width ρ* scaling with JET	Pedestal width physics
747	D.C. McDonald	UKAEA Culham	Gyroradius scaling along ITER-relevant path	Transport and confinement
748	R.J. La Haye	GA	Simultaneous ECCD control of BOTH 3/2 and 2/1 NTMs	NTM control for ITER
749	M. Groth	LLNL	Neutral fueling profile in the new lower divertor geometry	Pedestal width physics
750	M. Groth	LLNL	Deuterium and carbon flows in the main SOL in DIII-D	Boundary
751	M.R. Wade	GA	Impurity enrichment in DN plasma using puff and pump	Boundary
752	M. Groth	LLNL	Carbon flows in the inner main SOL in DIII-D	Boundary
753	M.R. Wade	GA	Direct measurement of the edge bootstrap current	Heating and current drive
754	A.W. Leonard	GA	Measurement of pedestal density pinch	Pedestal width physics
755	M.R. Wade	GA	ELM suppression at q_{95} ~ 3	ELM control for ITER
756	P. Gohil	GA	Maximize electron density in QH-mode plasmas with different plasma rotation and a strong shaping	ELM control for ITER
757	A.W. Leonard	GA	Low density radiative divertor by pellet and impurity injection	Boundary
758	P.C. Stangeby	GA, LLNL and U. Toronto	Quantitative oxidation of DIII-D following ^{13}C deposition	Boundary

ID#	Name	Affiliation	Title	Research Area
759	T.C. Luce	GA	ITER advanced baseline scenario demonstration discharge with ρ^* scan	ITER hybrid scenarios
760	P. Gohil	GA	Real time control of ITBs	Transport and confinement
761	T.C. Luce	GA	ITER baseline scenario demonstration discharge with ρ^* scan	Transport and confinement
762	A.W. Leonard	GA	Pellet triggered ELM energy loss	ELM control for ITER
763	T.C. Luce	GA	Extension of weak shear steady-state scenario to $>2\tau_R$	Advanced scenario development
764	A.W. Leonard	GA	Pedestal bootstrap current collisionality dependence	Heating and current drive
765	P.C. Stangeby	GA, LLNL and U. Toronto	Measurements of the effects of small wall gaps	Boundary
766	H. Reimerdes	Columbia U.	Test of enhanced neoclassical “ripple” viscosity in co- and counter-NBI discharges	Stability and control
767	L.R. Baylor	ORNL	Test of beam driven rotation enhancement to neoclassical theory	Transport and confinement
768	S. Harrison	U. Wisc., Madison	Neutral particle erosion/deposition measurements between tile gaps	Boundary
769	T.C. Luce	GA	Optimize ECCD in weak shear scenario	Advanced scenario development
770	H. Reimerdes	Columbia U.	Measurement of the n=1 RWM dispersion relation in plasmas with high q_{min}	Advanced scenario development
771	A.W. Leonard	GA	Pedestal bootstrap current modification by the ELM cycle	Boundary
772	T.C. Luce	GA	Compare SN and DN shape performance in weak shear scenario	Advanced scenario development
773	A.W. Leonard	GA	ECH direct electron heating of the pedestal	Pedestal width physics
774	P. Politzer	GA	NBCD profile	Heating and current drive
775	A.W. Leonard	GA	ECH modification of the edge bootstrap current in QH-mode	ELM control for ITER
776	P.C. Stangeby	GA, LLNL and U. Toronto	Regular monitoring of the plasma conditioning of the new divertor tiles using a standard discharge	Boundary
777	T.C. Luce	GA	Extend $\beta_N>4$ phase in high ℓ_i discharges to $>5\ \tau_E$	Advanced scenario development
778	A.W. Leonard	GA	ECH current drive modification of edge stability	Stability and control
779	J. Jayakumar	LLNL	Achieving $\beta_N>3$ in QH mode with RWM control	RWM control for ITER

ID#	Name	Affiliation	Title	Research Area
780	G.R. McKee	U. Wisc., Madison	Mach number scan for direct comparison of growth and shearing rates of turbulence	Transport and confinement
781	P. Politzer	GA	Seed islands for NTMs	Stability and control
782	P. Politzer	GA	Bootstrap current near the axis	Heating and current drive
783	J.C. Hosea	PPPL	Fast wave modulation experiment to determine FW power deposition properties	Heating and current drive
784	P. Politzer	GA	Effect of loop voltage on the pedestal profile	Pedestal width physics
785	G.R. McKee	U. Wisc., Madison	Collisional damping of zonal flows and GAMs	Transport and confinement
786	P. Politzer	GA	Burn control simulation	Advanced scenario development
787	L.W. Owen	ORNL	Pedestal fueling before and after lower divertor modification	Pedestal width physics
788	T. Scoville	GA	Development of real-time rotation feedback control	Stability and control
789	R. Groebner	GA	Role of toroidal rotation in the pedestal	Pedestal width physics
790	R.I. Pinsker	GA	FW-only H-mode studies	Heating and current drive
791	J.C. Wesley	GA	D3D database survey for disruption data	Stability and control
792	E. Lazarus	ORNL	Sawtooth physics bean/oval comparisons	Stability and control
793	D.J. Schlossberg	U. Wisc., Madison	Fluctuation characterization in Advanced Tokamak scenarios	Advanced scenario development
794	M. Walker	GA	Develop and test on-line methods for adaptive control	Stability and control
795	T.C. Luce	GA	Use of I-coils to limit the edge pedestal in high ℓ_i scenario	Advanced scenario development
796	J.C. Wesley	GA	Automated data mining methods for DIII-D	Stability and control
797	T.C. Luce	GA	Demonstration of target q profile controller	Advanced scenario development
798	T.C. Luce	GA	Hybrid candidate scenario with $T_e = T_i$	ITER hybrid scenarios
799	T.E. Evans	GA	High resolution pedestal profiles during RMP ELM control	ELM control for ITER
800	J.C. Wesley	GA	MGI Experiments with $N > N_{Rosenbluth}$	Stability and control
801	T.C. Luce	GA	Extend present hybrid scenario to lower q_{95}	ITER hybrid scenarios

ID#	Name	Affiliation	Title	Research Area
802	S.I. Krasheninnikov	UCSD	Plasma in shadow regions	Boundary
803	T.C. Luce	GA	Effect of torque on confinement in hybrid discharges	ITER hybrid scenarios
804	T.C. Luce	GA	Operation of hybrid scenarios above the no-wall n=1 limit	ITER hybrid scenarios
805	S.I. Krasheninnikov	UCSD	Impact of edge RMP on L-mode transport	Boundary
806	T.C. Luce	GA	Variation of squareness to change q(0)	ITER hybrid scenarios
807	P. Politzer	GA	NTM to KAW mode conversion and current drive	ITER hybrid scenarios
808	T.C. Luce	GA	Stabilization of sawteeth in H-mode by ECCD	Stability and control
809	P. Politzer	GA	Current profile modification by fast ion diffusion	ITER hybrid scenarios
810	T.C. Luce	GA	Stability of plasmas with $q(0) < 1$	Stability and control
811	P. Politzer	GA	ELMs, NTMs, and the q profile	ITER hybrid scenarios
812	T.C. Luce	GA	Is suppression of smaller tearing modes easier?	Stability and control
813	P. Politzer	GA	Is a modified q profile the key to hybrid performance?	ITER hybrid scenarios
814	T.C. Luce	GA	Is the 3/2 mode worth suppressing?	Stability and control
815	C. Holcomb	LLNL	Determine poloidal rotation using improved MSE for E_r and CER for ∇P and v_{tor}	Transport and confinement
816	T.C. Luce	GA	ρ^* scaling of the tearing mode onset	Stability and control
817	P. Politzer	GA	Can a hybrid be made in a low rotation plasma?	ITER hybrid scenarios
818	M. Makowski	LLNL	Observation of stochastic edge with fast MSE diagnostic	Boundary
819	T.C. Luce	GA	Mass scaling of transport and the L/H threshold	Transport and confinement
820	P. Politzer	GA	Broadband MHD and confinement in HBPNI plasmas	Heating and current drive
821	P. Politzer	GA	Lower q_{95} and higher gain in HBPNI plasmas	Heating and current drive
822	T.C. Luce	GA	Confinement near the Greenwald limit	Transport and confinement
823	P. Politzer	GA	HBPNI plasmas with constant power input	Heating and current drive
824	W.M. Solomon	PPPL	Study of rotation scaling with varying momentum input	Transport and confinement
825	W.M. Solomon	PPPL	Dependence of impurity poloidal rotation on neoclassically relevant quantities	Transport and confinement

ID#	Name	Affiliation	Title	Research Area
826	P. Politzer	GA	100% bootstrap	Heating and current drive
827	W.M. Solomon	PPPL	Dependence of main ion species poloidal rotation on neoclassically relevant quantities	Transport and confinement
828	W.M. Solomon	PPPL	Degradation of momentum confinement with increasing torque	Transport and confinement
829	W.M. Solomon	PPPL	Poloidal spin up of plasma using off-axis neutral beam injection	Transport and confinement
830	W.M. Solomon	PPPL	Rotation requirements for QH-mode	ELM control for ITER
831	W.M. Solomon	PPPL	Does the plasma spin up poloidally during ITB formation?	Transport and confinement
832	P. Politzer	GA	Development and demonstration of demonstrably noninductive, high beta, stationary plasmas	Advanced scenario development
833	W.M. Solomon	PPPL	Direct observation of zonal flow by studying E_r fluctuations	Transport and confinement
834	W.M. Solomon	PPPL	Poloidal rotation comparison between forward and reverse B_T	Transport and confinement
835	M. Makowski	LLNL	Physics of NTMs (anatomy of a tearing mode)	Stability and control
836	P. Politzer	GA	Control of self-consistent, high β_p plasmas	Advanced scenario development
837	W.M. Solomon	PPPL	Poloidal rotation measurements of helium plume	Transport and confinement
838	T.E. Evans	GA	Is RMP screening a significant factor in RMP ELM control discharges?	ELM control for ITER
839	C.C. Petty	GA	Sustaining low q(0) with monster sawtooth control	Advanced scenario development
840	W.M. Solomon	PPPL	Effect of rotation on energy confinement	Transport and confinement
841	T.C. Luce	GA	ρ^* scaling of transport near the LH threshold	Transport and confinement
842	T.C. Luce	GA	Measurement of the ITG threshold and its dependence	Transport and confinement
843	T.C. Luce	GA	Mach number scans in L and H mode	Transport and confinement
844	T.C. Luce	GA	NBCD code/experiment benchmark	Heating and current drive
845	T.C. Luce	GA	Bootstrap current code/experiment benchmark	Heating and current drive
846	T.C. Luce	GA	Documentation of heat flux profile on lower divertor in low-recycling plasmas	Boundary
847	H. Reimerdes	Columbia U.	Development of a n=2 RWM detector	RWM control for ITER

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848	M. Makowski	LLNL	MSE calibration shots for H&CD diagnosis	Heating and current drive
849	H. Reimerdes	Columbia U.	ITER-AT demonstration discharge	Advanced scenario development
850	H. Takahashi	PPPL	Measure radial profile of SOL current during RWM to infer B-field generated by current inside plasma	RWM control for ITER
851	G. Jackson	GA	Comparison of external and internal coils for RWM stabilization at low rotation	RWM control for ITER
853	H. Reimerdes	Columbia U.	Comparison of RWM feedback performance of internal and external control coils with feedback models	RWM control for ITER
854	G. Jackson	GA	Robust low rotation RWM target discharges	RWM control for ITER
855	G. Jackson	GA	Critical rotation threshold for RWM stabilization above the no-wall limit	RWM control for ITER
856	H. Reimerdes	Columbia U.	SND low-rotation target for RWM feedback	RWM control for ITER
857	R.I. Pinsker	GA	High harmonic absorption studies	Heating and current drive
858	H. Takahashi	PPPL	Filamentary structures in SOL current (SOLC) during ELM	ELM control for ITER
859	G. Jackson	GA	Evaluation of high speed actuators: SPAs vs. audio amplifiers	RWM control for ITER
860	H. Takahashi	PPPL	Control mode and/or plasma rotation in RWM discharges through entraining by traveling I-coil current	Stability and control
861	G. Jackson	GA	Sustained AT discharges near the ideal wall beta limit at low rotation	RWM control for ITER
862	K.H. Burrell	GA	Turbulence spreading experiment in plasma core	Transport and confinement
863	H. Takahashi	PPPL	Controlling ELMs and SOL current (SOLC) in high β_N discharges using external n=1 field	ELM control for ITER
864	H. Reimerdes	Columbia U.	Effect of magnetic field errors and rotation profiles on the critical rotation for RWM stabilization	RWM control for ITER
865	H. Takahashi	PPPL	Measurement of Sheath Conditions at Divertor Plates during ELM Pacing by Pellet Injection Experiment	ELM control for ITER
866	G. Jackson	GA	Role of ELMs in RWM feedback stabilized low rotation discharges	RWM control for ITER
867	K.H. Burrell	GA	Turbulence spreading experiment in the plasma edge	Transport and confinement
868	G. Jackson	GA	Benchmark RWM growth rates vs β_N in low rotation discharges	RWM control for ITER
869	C.C. Petty	GA	Gyroradius scaling in hybrid plasmas	ITER hybrid scenarios

ID#	Name	Affiliation	Title	Research Area
870	K.H. Burrell	GA	Role of equilibrium ExB shear and zonal flows in core barrier formation at integer $q_{\min}$	Transport and confinement
871	G. Jackson	GA	Induced rotation using n=1 rotating fields	ELM control for ITER
872	K.H. Burrell	GA	Prompt torque and zonal flow damping	Transport and confinement
873	K.H. Burrell	GA	Measurements for Milestone 161	Transport and confinement
874	M.E. Austin	U. Texas	Role of equilibrium ExB shear and zonal flows in core barrier formation at integer $q_{\min}$	Transport and confinement
875	G. Jackson	GA	ECH 2nd harmonic pre-ionization	Heating and current drive
876	H. Reimerdes	Columbia U.	RWM detection/feedback using midplane and off-midplane poloidal and radial field sensors	RWM control for ITER
877	K.H. Burrell	GA	QH-mode with balanced beams	ELM control for ITER
878	K.H. Burrell	GA	Investigate high triangularity QH-mode	ELM control for ITER
879	G. Jackson	GA	VH-mode with double OSP pumping	ELM control for ITER
880	K.H. Burrell	GA	Effect of error field minimization on QH-mode plasmas	ELM control for ITER
881	G. Jackson	GA	F. Nave: Extending the ELM-free period in co-injection plasmas	ELM control for ITER
882	K.H. Burrell	GA	RF sustained QH-mode	ELM control for ITER
883	C.C. Petty	GA	Balanced NBI startup of hybrid discharges	ITER hybrid scenarios
884	K.H. Burrell	GA	Modulated transport studies of all four transport channels	Transport and confinement
885	K.H. Burrell	GA	Identify turbulence modes by frequency shift	Transport and confinement
886	K.H. Burrell	GA	Effect of I_p ramps on edge parameters at the L-H transition	Transport and confinement
887	K.H. Burrell	GA	Main ion poloidal rotation measurements in helium plasmas	Transport and confinement
888	R.I. Pinsker	GA	High central fast wave current drive efficiency at high electron beta with 110 GHz ECH	Heating and current drive
889	J. Ferron	GA	Develop steady-state q profile control	Advanced scenario development
890	J. Ferron	GA	The role of wall stabilization in high beta, high ℓ_i discharges	Advanced scenario development
891	C.C. Petty	GA	Dependence of beta limit on no-wall stability limit	ITER hybrid scenarios

ID#	Name	Affiliation	Title	Research Area
892	H. Reimerdes	Columbia U.	Improved RWM sensor compensation	RWM control for ITER
893	J. Ferron	GA	Sustained high ℓ_i, high beta discharges	Advanced scenario development
894	M.E. Austin	U. Texas	Rational q triggered transport changes in discharges with $T_e > T_i$ and without fast ions	Transport and confinement
895	R.I. Pinsker	GA	FW antenna system checkout	Heating and current drive
896	J. Ferron	GA	Find the optimum AT q and pressure profiles in the new pumped double-null shape	Advanced scenario development
897	J. Ferron	GA	Stabilize the 2/1 NTM to extend the AT high performance phase	Advanced scenario development
898	K.H. Burrell	GA	RMP effects on QH-mode and EHO	ELM control for ITER
899	J. Ferron	GA	Improve dRsep control	Stability and control
900	C.C. Petty	GA	Hybrid characteristics over a range of beta	ITER hybrid scenarios
901	J. Ferron	GA	Develop simultaneous beta and rotation control	Stability and control
902	M. Makowski	LLNL	Feedback control on MSE E_r	Stability and control
903	M. Murakami	ORNL	ITER accessibility and sustainment of hybrid regime using RF and NBI	ITER hybrid scenarios
904	C.C. Petty	GA	Improved hybrid performance with dominant 4/3 NTM	ITER hybrid scenarios
905	G.R. McKee	U. Wisc., Madison	Excitation of the geodesic acoustic mode via radial field oscillation	Transport and confinement
906	J. Ferron	GA	Alternate approach to producing a high beta, high ℓ_i discharge	Advanced scenario development
907	G. Wang	UCLA	Electron transport and electron channel ITB formation mechanism in simultaneous ITB plasmas	Transport and confinement
908	C.C. Petty	GA	Fiducial hybrid discharges	ITER hybrid scenarios
909	W.M. Solomon	PPPL	Poloidal rotation comparison between forward and reverse I_p	Transport and confinement
910	G. Wang	UCLA	Measure turbulence at pedestal using new/upgraded quadrature reflectometer systems and explore its r	Pedestal width physics
911	G.R. McKee	U. Wisc., Madison	Beta scaling of turbulence and transport in hybrid scenario discharges	ITER hybrid scenarios
912	G. Wang	UCLA	Turbulence and flow dynamics across the L-H transition	Transport and confinement

ID#	Name	Affiliation	Title	Research Area
913	M. Murakami	ORNL	FWCD in AT	Advanced scenario development
914	G. Wang	UCLA	Modulated electron particle transport studies in QDB/QH discharges	Transport and confinement
915	C.C. Petty	GA	Is the 3/2 NTM worth suppressing in hybrid discharges?	ITER hybrid scenarios
916	R.I. Pinsker	GA	Effect of fast ion radial transport on 4th harmonic absorption	Heating and current drive
917	A. Pigarov	UCSD	The role of dust in impurity/tritium migration	Boundary
918	A. Pigarov	UCSD	Observation of dust-blob and dust-ELM interactions	Boundary
919	A. Pigarov	UCSD	Nanometer-size dust inventory measurements	Boundary
920	A. Pigarov	UCSD	Intrinsic dust migration and dust production rate evaluation	Boundary
921	A. Pigarov	UCSD	Carbon-dust shield for deep gas puffing and disruption mitigation	Boundary
922	R.I. Pinsker	GA	Documentation of switch-over from 2nd harmonic thermal H absorption to 4th harmonic absorption	Heating and current drive
923	A. Pigarov	UCSD	The effect of RMP on parallel plasma flows and impurity transport	Boundary
924	R.I. Pinsker	GA	Minority ion current drive study	Heating and current drive
925	A. Pigarov	UCSD	Helium day: SAPP and RMP shots	Boundary
926	A. Pigarov	UCSD	Plasma flows in "long leg" divertor	Boundary
927	A. Pigarov	UCSD	Is working gas released from or deposited on PFCs during ELM?	Boundary
928	C. Greenfield	GA	SN/DN comparisons in AT discharges	Advanced scenario development
929	C. Greenfield	GA	Fast wave coupling to AT discharges	Advanced scenario development
930	C. Greenfield	GA	Real-time current profile control	Advanced scenario development
931	C. Greenfield	GA	Weak shear scenario with normal B_T	Advanced scenario development
932	T.A. Casper	LLNL	Improve QDB performance using EC density control	Advanced scenario development
933	C. Greenfield	GA	Optimized AT with newly available tools	Advanced scenario development
934	T.A. Casper	LLNL	Co- vs counter-NBI QH/QDB	ELM control for ITER

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935	C. Greenfield	GA	AT discharges with $T_e \sim T_i$	Advanced scenario development
936	T.A. Casper	LLNL	Particle transport and T_e/T_i	Transport and confinement
937	C. Greenfield	GA	Can high beta ITBs be made (less un) stationary?	Advanced scenario development
938	T.A. Casper	LLNL	ECH/ECCD in pedestal region to explore peeling-ballooning mode stability	ELM control for ITER
939	C. Greenfield	GA	High beta ITBs with density control	Advanced scenario development
940	C. Greenfield	GA	QDB co/counter beam scan	Advanced scenario development
941	T.E. Evans	GA	Is particle pump out in low ν* RMP ELM control shots due to enhanced transport or reduced sources?	ELM control for ITER
942	T.E. Evans	GA	Are small bursts in the high ν* RMP ELM suppressed state related to stellarator ELMs?	ELM control for ITER
943	D. Gupta	U. Wisc., Madison	Identification of dominant turbulence instability mode	Transport and confinement
944	C. Kessel	PPPL	Application of FWEH and FWCD to high beta ITB discharges	Advanced scenario development
945	C. Kessel	PPPL	Outer squareness impact on beta limits	Advanced scenario development
946	S. Brezinsek	Forschungszentrum Juelich	Hydrocarbon injection for quantification of erosion yields in the detached outer divertor of DIII-D	Boundary
947	S. Brezinsek	Forschungszentrum Juelich	Deuterium injection for quantification of the recycling flux in the detached outer divertor of DIII-	Boundary
948	A. Loarte	EFDA-CSU Garching	DIII-D/JET pedestal ELM similarity experiments	Pedestal width physics
949	A. Loarte	EFDA-CSU Garching	Characterization of disruptive/pre-disruptive energy load and timescale for ITER relevant disruptions	Stability and control
950	C. Greenfield	GA	AT scenarios with reduced rotation	Advanced scenario development
951	C. Greenfield	GA	ITB torque scan	Transport and confinement
952	C. Greenfield	GA	ITB dynamics while changing between pressure gradient and rotation dominated ExB shear	Transport and confinement

ID#	Name	Affiliation	Title	Research Area
953	C. Greenfield	GA	Hybrid discharges with $T_e \sim T_i$	ITER hybrid scenarios
954	R. Bravenec	U. Texas	Validation of GYRO using DIII-D discharges	Transport and confinement
955	M. Okabayashi	PPPL	RWM controllability with external coils and extrapolation in the ITER performance	RWM control for ITER
957	M. Okabayashi	PPPL	Sensor issues for robust feedback operation with audio amplifiers	RWM control for ITER
958	M. Okabayashi	PPPL	Feedback logic in PCS including plasma rotation	RWM control for ITER
959	M. Okabayashi	PPPL	Low-rotation target development for RWM — we are rapidly approaching the serious need of q_{min} contr	RWM control for ITER
960	M. Okabayashi	PPPL	The impact of mutual coupling between I-coil and mode/wall eddy current with voltage controlled I-coil	RWM control for ITER
961	M. Okabayashi	PPPL	Exploration of mechanism of RWM excited by ELM	RWM control for ITER
962	M. Okabayashi	PPPL	Possibility of ELM and RWM direct coupling	RWM control for ITER
963	M. Okabayashi	PPPL	Predicting RWM control performance with the Internal coil on ITER	RWM control for ITER
964	M. Okabayashi	PPPL	Search for a better definition for " the measure of critical rotation for RWM	RWM control for ITER
965	M. Okabayashi	PPPL	Global plasma characteristics of feedback stabilized high C_β plasma	RWM control for ITER
966	M. Okabayashi	PPPL	Magnetic feedback stabilization of MHD modes (NTM, RWTM etc.) by forcing the mode to rotate	NTM control for ITER
967	M. Murakami	ORNL	Role of ECCD in sustainment of weak shear steady state scenario	Advanced scenario development
968	M. Murakami	ORNL	Co + counter NBI for high beta AT without overdrive	Advanced scenario development
969	T.E. Evans	GA	Low triangularity, low ν*, RMP ELM control shape development	ELM control for ITER
970	D. Rudakov	UCSD	Role of coherent modes on edge pedestal and ELM behavior	ELM control for ITER
971	D. Rudakov	UCSD	Dependence of far SOL intermittent transport on connection length	Boundary
972	D. Rudakov	UCSD	Dependence of C deposition and D co-deposition rates on the surface temperature	Boundary
973	D. Rudakov	UCSD	Migration of micron size carbon dust in tokamak divertor and SOL	Boundary
975	T. Osborne	GA	Dimensionless scaling of H-mode pedestal transport barrier width and ELM size	Pedestal width physics

ID#	Name	Affiliation	Title	Research Area
976	T. Osborne	GA	Grassy ELMs in DIII-D	ELM control for ITER
977	T. Osborne	GA	Small ELMs with large pedestal pressure by controlling the relationship of T_e and n_e profiles	ELM control for ITER
978	T.E. Evans	GA	High triangularity, low ν*, RMP ELM control shape development	ELM control for ITER
979	T.E. Evans	GA	Ultra low B_T RMP ELM control	ELM control for ITER
980	M. Shafer	U. Wisc., Madison	Turbulence dynamics during power and rotation scan of ITB formation	Transport and confinement
981	M. Shafer	U. Wisc., Madison	Stationary L-mode discharges for nonlinear turbulence studies	Transport and confinement
982	J.E. Menard	PPPL	Pedestal density dependence of beta limit in DND AT plasmas	Advanced scenario development
983	A. McLean	U. Toronto	Simulation of wall chemical sputtering using methane puffing into USN plasmas with the PPI	Boundary
984	T. Strait	GA	Low rotation target plasma for RWM feedback	RWM control for ITER
985	J.E. Menard	PPPL	Measurement of n=2 RWM stability in DIII-D AT plasmas	RWM control for ITER
986	T. Strait	GA	First RWM feedback with low rotation target	RWM control for ITER
987	A. McLean	U. Toronto	Simulation of wall chemical sputtering using strong methane puffing into LSN high density plasmas	Boundary
988	T. Strait	GA	Comparison of internal vs. external coils for RWM control	RWM control for ITER
989	T. Strait	GA	Locked mode suppression by feedback control	Stability and control
990	T. Strait	GA	Error field control by optimization of rotation	Stability and control
991	R.A. Moyer	UCSD	Dependence of “small events” on mode spectrum, density, shape, and collisionality	ELM control for ITER
992	C.C. Petty	GA	Suppression of multiple tearing modes with ECCD	NTM control for ITER
993	R.A. Moyer	UCSD	Investigation of plasma shielding of RMP with internal magnetic measurements	ELM control for ITER
994	R.A. Moyer	UCSD	Effect of error fields and RMPs on H-mode power threshold and transport barrier	Transport and confinement
995	R.A. Moyer	UCSD	Measurement of the electrostatic and magnetic Reynolds stresses across the L-H	Transport and confinement
996	C.C. Petty	GA	Simultaneous suppression of 3/2 and 4/3 NTM with ECCD	ITER hybrid scenarios

ID#	Name	Affiliation	Title	Research Area
997	R.A. Moyer	UCSD	Role of inward particle pinches in the H-mode and ELM suppressed discharges	ELM control for ITER
998	H. Takahashi	PPPL	Control mode and/or plasma rotation in RWM discharges through entraining by traveling I-coil current	RWM control for ITER
999	H. Takahashi	PPPL	Controlling ELM and SOL current (SOLC) in high β_N discharges using external n=1 field	RWM control for ITER
1002	T. Osborne	GA	Physics of Type I ELM suppression with odd I-coil parity at medium collisionality	ELM control for ITER
1003	M.R. Wade	GA	Low squareness, high ℓ_i scenario development	Advanced scenario development
1004	T. Osborne	GA	NTM stability in even parity, low collisionality I-coil ELM suppressed discharges	ELM control for ITER
1005	M.R. Wade	GA	What is the cause of transport improvement in hybrid discharges?	ITER hybrid scenarios
1006	J. Jayakumar	LLNL	QH mode hybrid-test of the need for ELM-NTM coupling for profile stationarity	ITER hybrid scenarios
1007	M.J. Schaffer	GA	New C-coil error correction for 2006	Stability and control
1008	J. Jayakumar	LLNL	Achieving β_N>3 in QH mode with RWM control	ELM control for ITER
1009	E. Fredrickson	PPPL	Co and ctr NBI study of CAE/GAE	Stability and control
1010	T.E. Evans	GA	Exploration of mode spectrum effects in low ν* RMP ELM control discharges	ELM control for ITER
1011	M. Murakami	ORNL	Pumped DND for weak shear, steady state scenario	Advanced scenario development
1012	M. Murakami	ORNL	Co and counter neutral beam current drive characterization	Heating and current drive
1013	T.E. Evans	GA	q_{95}=3 low ν* RMP ELM control	ELM control for ITER
1014	M.J. Schaffer	GA	Measure large-scale B-coil horizontal magnetic error	Stability and control
1015	A. Mahdavi	GA	Evaluate density control in DN AT discharges	Advanced scenario development
1017	E. Fredrickson	PPPL	Search for TAE in NSTX similarity plasmas	Stability and control
1018	T.A. Casper	LLNL	High collisionality operation for BOUT modeling studies	ELM control for ITER
1019	T.E. Evans	GA	Can the low ν* RMP ELM control power limit be exceeded in DIII-D?	ELM control for ITER

ID#	Name	Affiliation	Title	Research Area
1022	A. Mahdavi	GA	Optimization of particle control in double null AT plasmas	Boundary
1023	M.J. Schaffer	GA	Radial location of rotation braking by magnetic perturbations	Stability and control
1024	T.E. Evans	GA	Can low ν* RMP ELM control be obtained in reverse B_T?	ELM control for ITER
1025	I.N. Bogatu	FAR-TECH, Inc.	Investigation of n=1 RWM internal structure and its evolution	RWM control for ITER
1026	I.N. Bogatu	FAR-TECH, Inc.	Does RWM interact with divertor?	RWM control for ITER
1027	M.J. Schaffer	GA	Minimum bake temperature for expeditious tokamak operation	Boundary
1028	L.L. Lao	GA	Rotational shielding of error or applied perturbation magnetic field by plasmas	Stability and control
1029	Y. In	FARTECH, Inc.	ELM-noise discriminated RWM feedback control using wall eigenmode-based Kalman filter	RWM control for ITER
1030	Y. In	FARTECH, Inc.	Robust model-based RWM feedback control	RWM control for ITER
1031	L.L. Lao	GA	Rotational Plasma Response to Resonant Magnetic Perturbations	ELM control for ITER
1032	T.L. Rhodes	UCLA	Test of magnetic shear dependence of low, intermediate and high *k* turbulence	Transport and confinement
1033	T.L. Rhodes	UCLA	Test of T_e/T_i dependence of low, intermediate and high *k* turbulence	Transport and confinement
1034	T.L. Rhodes	UCLA	Measurement of k_θ component of high *k* turbulence	Transport and confinement
1035	T.L. Rhodes	UCLA	Is high-*k* turbulence a significant contributor to the transport dynamics in the pedestal of H-mode p	Pedestal width physics
1036	T.L. Rhodes	UCLA	Effect of ECH on low, intermediate and high *k* turbulence during density pumpout	Transport and confinement
1037	T.L. Rhodes	UCLA	Spatial distribution of turbulence and correlation lengths in and around the barrier region of core	Transport and confinement
1038	T.L. Rhodes	UCLA	Test of turbulence dependence on ρ* via working gas species	Transport and confinement
1039	T.L. Rhodes	UCLA	Low $\hat{s}$ plasmas for comparison to ETG simulations	Transport and confinement
1040	T.L. Rhodes	UCLA	Effect of T_e/T_i variation on low, intermediate, and high *k* turbulence on NSTX and DIII-D	Transport and confinement
1041	T.L. Rhodes	UCLA	Slow modulation of I-coil for perturbation studies	ELM control for ITER
1042	T.L. Rhodes	UCLA	Spatial distribution of low, intermediate, and high *k* turbulence	Transport and confinement
1043	H. Reimerdes	Columbia U.	RWM spectroscopy of the n=2 and n=3 RWM	RWM control for ITER

ID#	Name	Affiliation	Title	Research Area
1044	H. Reimerdes	Columbia U.	Measurement of the n=1 no-wall stability limit in the hybrid scenario using active MHD spectroscopy	ITER hybrid scenarios
1045	M. Zarnstorff	PPPL	Exploration and documentation of 3D magnetic perturbations on plasma equilibrium	Stability and control
1046	D.M. Thomas	GA	Hysteresis in edge current density during ELM limit cycle	Stability and control
1047	J.G. Watkins	SNL	Determine RMP character through target plate profiles	ELM control for ITER
1048	J.G. Watkins	SNL	Density reduction of AT plasmas using external magnetic perturbations	Advanced scenario development
1049	M. Murakami	ORNL	Effects of q_{min} in weak shear, steady state scenario	Advanced scenario development
1050	L. Zeng	UCLA	Investigation of density and magnetic fluctuations during ELM suppression phase	ELM control for ITER
1051	J.G. Watkins	SNL	Observe magnetic perturbations through edge and X-point gas puffing	ELM control for ITER
1052	J.G. Watkins	SNL	ELM control through X-point gas puffing	ELM control for ITER
1053	L. Zeng	UCLA	Measurement of particle transport coefficient in ELM suppressed phases	ELM control for ITER
1054	L. Zeng	UCLA	Dynamics of pedestal perturbations of ELMs of type II, III and I	Boundary
1055	J.G. Watkins	SNL	Measure particle removal efficiency using the new lower divertor pumping baffle	Boundary
1056	J.G. Watkins	SNL	How does the scrape-off layer vary with magnetic balance and magnetic perturbations?	ELM control for ITER
1057	M. Maraschek	Max-Planck-Intistitut fuer Plasmaphysik	Joint marginal β_p scaling of the (2/1)-NTM between ASDEX Upgrade, DIII-D and JET	Stability and control
1058	G. Saibene	EFDA CSU – Garching	ELM suppression at low ν^* in standard ELMy H-modes	ELM control for ITER
1059	R. Sartori	EFDA CSU – Garching	Dependence of max density for ELM suppression on I-coils current (perturbation intensity)	ELM control for ITER
1060	G. Saibene	EFDA CSU – Garching	Effect of ν^* on I-coil ELM suppression in ELMy H-modes	ELM control for ITER
1061	R. Sartori	EFDA CSU – Garching	Effect of plasma shape (triangularity) on ELM suppression at low ν^*	ELM control for ITER
1062	A. Loarte	EFDA CSU – Garching	Effect of I-coil polarity on ELMs at high n/ ν^*	ELM control for ITER
1063	A. Loarte	EFDA CSU – Garching	Effect of input power on ELM suppression/reduction at high n/ ν^*	ELM control for ITER
1064	R.J. Buttery	UKAEA Culham	ELM control with n=1 fields	ELM control for ITER

ID#	Name	Affiliation	Title	Research Area
1065	G. Sips	IPP Garching	Hybrid operation at $q_{95} = 5\text{-}5.5$, a comparison with AT scenarios	ITER hybrid scenarios
1066	G. Sips	IPP Garching	Hybrid operation at high density, a comparison with ASDEX Upgrade	ITER hybrid scenarios
1067	P.R. Thomas	CEA Cadarache	Density and collisionality effects in plasmas with the edge controlled by the I-coils	ELM control for ITER
1068	L.W. Owen	ORNL	Pedestal characterization with active pumping	Pedestal width physics
1069	G. Navratil	Columbia U.	Feedback control of n=2 and n=3 RWM	RWM control for ITER
1070	L.W. Owen	ORNL	Pedestal fueling and transport in QH-mode discharges	Pedestal width physics
1071	Y. Liang	Forschungszentrum Juelich	Influence of the plasma rotation on the Type-I ELMy H-mode	ELM control for ITER
1072	G. Navratil	Columbia U.	Noise and ELM suppression using VALEN derived Kalman filter	RWM control for ITER
1073	K.W Hill	PPPL	Study of heating, transport, and intrinsic rotation physics in plasmas without NBI	Transport and confinement
1074	G. Navratil	Columbia U.	Advanced feedback algorithms	RWM control for ITER
1075	A. McLean	U. Toronto	Studies of impurity flow and recycling in the SOL and divertor of plasmas with a hot vessel wall	Boundary
1076	I. Joseph	UCSD	RMP effects in DN plasmas	ELM control for ITER
1077	I. Joseph	UCSD	Rotating RMP physics	ELM control for ITER
1078	D.J. Mazon	CEA Cadarache	Feedback control of the current and kinetic profiles	Advanced scenario development
1079	P. Gohil	GA	Obtain high performance, steady state plasmas in near ITER-like conditions	Advanced scenario development
1080	E. Doyle	UCLA	Search for ITG/TEM line splitting	Transport and confinement
1081	E. Doyle	UCLA	QDB operation at high beta	Advanced scenario development
1082	J. Ferron	GA	Discharges with complete 2nd stable regime access	Stability and control
1083	G. Jackson	GA	NTM control using I-coils with feedback	NTM control for ITER
1084	P. Politzer	GA	Perpendicular resistivity	Heating and current drive
1085	E. Doyle	UCLA	Further development of high beta ITB discharges	Advanced scenario development

ID#	Name	Affiliation	Title	Research Area
1086	S.A. Sabbagh	Columbia U.	Aspect ratio comparison of RWM stabilization by rotation (joint experiment with NSTX)	RWM control for ITER
1087	E. Doyle	UCLA	Determine steady-state capability of high beta ITB discharges	Advanced scenario development
1088	L. Zeng	UCLA	Characteristics of the small ELM during non-resonant magnetic perturbation in low collisionality plasma	ELM control for ITER
1089	P. Snyder	GA	QH shape and density access comparisons to theory	ELM control for ITER
1090	P. Snyder	GA	Detailed study of the EHO and comparisons to theory	ELM control for ITER
1091	E.M. Hollmann	UCSD	Runaway electron formation, transport, and suppression during massive gas injection shutdowns	Stability and control
1092	E. Doyle	UCLA	Low density co-/balanced-NBI QH-mode	ELM control for ITER
1093	P. Snyder	GA	Characterization and scaling of the pedestal in low density discharges	Pedestal width physics
1094	P. Snyder	GA	Importance of pumping efficiency in RMP low density discharges	ELM control for ITER
1095	L. Zeng	UCLA	Effect of RMP location on density and temperature profiles in low collisionality plasma	ELM control for ITER
1096	D. Whyte	U. Wisc., Madison	Effect of rotation on radiation uniformity during disruption mitigation	Stability and control
1097	D. Whyte	U. Wisc., Madison	Effect of divertor surface temperature on carbon chemical erosion	Boundary
1098	E. Doyle	UCLA	Detailed T_i/T_e ratio scan in hybrid	ITER hybrid scenarios
1099	D. Whyte	U. Wisc., Madison	Effect of disruption-induced surface currents on melt layer stability	Stability and control
1100	D. Whyte	U. Wisc., Madison	Disruption-induced surface currents and ITER melt layer stability	Stability and control
1101	A. Hyatt	GA	Investigate apparent coupling between current quench rate and plasma shape	Stability and control
1102	T.C. Luce	GA	Measurement of the perpendicular resistivity	Heating and current drive
1103	Lei Zeng	UCLA	Effect of stochastic layer strength on pedestal width in low collisionality ELM suppression	Pedestal width physics
1104	E. Joffrin	CEA Cadarache	Rotation dependence on transport and NTM stability of the hybrid regime.	ITER hybrid scenarios
1105	E. Joffrin	CEA Cadarache	Role of rotation on ITB triggering by rational surfaces	Advanced scenario development

ID#	Name	Affiliation	Title	Research Area
1106	A.M. Garofalo	Columbia U.	β_N=5 for 2 seconds	Advanced scenario development
1109	M. Takechi	JAERI	Comparative study of RWM onset at near zero plasma rotation in DIIID/JT60U	RWM control for ITER
1110	A.M. Garofalo	Columbia U.	Target development for RWM feedback	RWM control for ITER
1111	A.M. Garofalo	Columbia U.	RWM feedback at low plasma rotation: I-coils vs C-coils	RWM control for ITER
1112	J. Jayakumar	LLNL	Formation of hybrid discharge starting from sawtoothing plasma	ITER hybrid scenarios
1113	A.M. Garofalo	Columbia U.	RWM feedback at low plasma rotation: B_p vs B_r sensors	RWM control for ITER
1114	J. Jayakumar	LLNL	Varying the size of sawteeth to study 2/1 NTM threshold using hybrid discharges	NTM control for ITER
1115	J.A. Boedo	UCSD	SOL turbulence and intermittency during I-coil operation	Boundary
1116	D.M. Thomas	General Atomics	Separation of Grad-T and grad-n drive terms in pedestal edge current.	Heating and current drive
1117	L. Zeng	UCLA	Search for the critical ExB velocity shear for ITG and ETG	Transport and confinement
1118	A.M. Garofalo	Columbia U.	Extend duration of β_N=4, q_{min}=2, E-coil = constant discharge 122959	Advanced scenario development
1119	A.M. Garofalo	Columbia U.	Active measurements of feedback stabilized plasmas	RWM control for ITER
1120	P. Gohil	GA	Energy confinement at low toroidal rotation	Transport and confinement
1121	D. Rudakov	UCSD	Monitoring dust levels after the dirty vent	Boundary
1122	T.E. Evans	GA	Runaway electron physics in high I_p KP and MGPI plasmas	Stability and control
1123	M. Porkolab	MIT	To resolve a conundrum in high harmonic fast wave physics on DIII-D	Heating and current drive
1125	C. Greenfield	GA	AT scenarios with reduced or eliminated ELMs	Advanced scenario development
1126	Edward Doyle	UCLA	ELM Suppressed Hybrid operation	ITER hybrid scenarios
1127	M.J. Schaffer	GA	Field-matched error correction	Stability and control
1128	J. Hughes	MIT	Pedestal evolution and scalings in ELM-free periods on DIII-D and C-Mod	Pedestal width physics
1129	T.E. Evans	General Atomics	Comparison of pedestal width (profile) evolution in ELM-free phase and between ELMs	Pedestal width physics

ID#	Name	Affiliation	Title	Research Area
1130	M.J. Schaffer	GA	I-coil error correction	Stability and control
1131	M.J. Schaffer	GA	ELM control by flexible-spectrum I-coil fields	ELM control for ITER
1132	M.F.F. Nave	Associacao EURATOM/IST	Test NTM onset by mode coupling	Stability and control
1133	J. Burruss	GA	Testing the ROF 2006 Forum	Transport and confinement
1134	W.M. Solomon	PPPL	Hysteresis of I-coil current requirement for ELM suppression	ELM control for ITER
1135	W.P. West	GA	Enhance the negative electric field well in RMP ELM suppressed and VH modes	ELM control for ITER
1139	M.R. Wade	GA	Density peaking/particle pinch versus collisionality	Transport and confinement
1140	A. Pigarov	UCSD	Study of parasitic plasma inside DiMES and MiMES	Boundary
1142	A. Pigarov	UCSD	Is dust produced on the surface of probes?	Boundary
1143	R. Groebner	GA	Effect of magnetic shear on pedestal width	Pedestal width physics
1144	J.A. Boedo	UCSD	$\dot{B}$ measurements of magnetic turbulence in high beta plasmas	Boundary
1145	C.C. Petty	GA	Effect of ∇B drift direction	ITER hybrid scenarios
1146	W.P. West	GA	Document divertor parameters during ELM-free regimes	Boundary
1147	S. Harrison	U. Wisc., Madison	NTM island width as an external control mechanism in burning plasmas	NTM control for ITER
1148	A.M. Garofalo	Columbia U.	n>1 RWM feedback	RWM control for ITER
1149	H. Takahashi	PPPL	Measure open loop growth rate as function of rotation at constant C_β	RWM control for ITER
1150	M. Okabayashi	PPPL	The study of RWM controllability during the RWM feedback by turning on feedback after a RWM excitation	RWM control for ITER
1151	M. Okabayashi	PPPL	The comparison of the feedback performance at low rotation with the category series of (114819)	RWM control for ITER
1152	M. Okabayashi	PPPL	Smart filtering proposed by Liu and M. Chu	RWM control for ITER
1153	M. Okabayashi	PPPL	ELM elimination of feedback using empirical combination of sensor signals	RWM control for ITER
1154	M. Okabayashi	PPPL	Assessing the n=2,3 existence due to ELM aftermath by advancing the n=1 phase in the feedback	RWM control for ITER
1155	M. Okabayashi	PPPL	Mode rigidity issue for ITER port plug	RWM control for ITER

ID#	Name	Affiliation	Title	Research Area
1156	M. Okabayashi	PPPL	Observation of possible ergodicity near the q=2 during feedback by applying high power ECCD/ECH	RWM control for ITER
1157	T.L. Rhodes	UCLA	Test of magnetic shear dependence of turbulence and comparison between DIII-D and NSTX	Transport and confinement
1158	T.A. Casper	LLNL	Improve performance and extend duration of QDB discharges using feedback control of density	Advanced scenario development
1159	F. Volpe	EURATOM/UKAEA Fusion Assoc.	Control of locked NTMs by EFCC and ECCD	NTM control for ITER
1160	S. Lisgo	U. Toronto	Characterization of inner divertor detachment using Balmer spectroscopy	Boundary