ABSTRACT

The objective of the fusion theory program at General Atomics (GA) is to significantly advance our scientific understanding of the physics of fusion plasmas and to support the DIII–D and other tokamak experiments as well as ITER research activities. The program plan is aimed at contributing significantly to the Fusion Energy Science, the Tokamak Concept Improvement, and ITER goals of the Office of Fusion Energy Sciences (OFES). Significant progress was made in each of the important areas of our research program during the last grant year GY09. This includes extensive testing of the pedestal height model EPED1 against a large number of H-mode discharges from various tokamaks under different plasma operating conditions, demonstration using the 3D MHD code NIMROD that in DIII-D discharges rapidly cooled by massive Ar injection the escaping electrons striking the outer divertor early in time and the main vacuum chamber later in time consistent with the experiments, development of a new TGLF collision model that demonstrates much better agreement against a large database of collisional GYRO simulations than the previous model, development of the TGYRO (steady state gyrokinetic transport) code that was successful in doing direct GYRO simulations of a DIII-D discharge with energy transport flows balanced against source flows, and performance of ORBIT-RF/AORSA simulations of DIII-D and NSTX HHFW experiments that qualitatively reproduces an outward radial shift of the fast-ion spatial distribution as measured by the FIDA diagnostic. GA theory staff also participated and contributed to the ReNew process.