# Plans for the PTRANSP Project

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Abstract for the 2007 Transport Task Force Meeting

PTRANSP, which is the predictive version of the TRANSP code, is being developed in a collaborative effort involving the Princeton Plasma Physics Laboratory, General Atomics Corporation, Lawrence Livermore National Laboratory, and Lehigh University. The PTRANSP project is intended to combine the models and capabilities that exist in codes such as ONETWO, CORSICA, TSC and BALDUR with those in TRANSP in order to produce an enhanced PTRANSP predictive capability for the fusion research community. It also provides a link to the SciDAC projects. Recent improvements to the PTRANSP code include the implementation of: (1) Newton's method for numerically stable predictions using stiff transport models such as GLF23 and MMM95; (2) the TEQ equilibrium solver for accurate and robust MHD equilibria; (3) a predictive H-mode pedestal model; and (4) the development of an object-oriented "Plasma State" data structure module, which facilitates the connection with other codes. The proposed advances in PTRANSP during the next three years include the implementation of: (1) predictive particle and momentum transport equations with theory-based transport coefficients; (2) the free-boundary features in the TEQ equilibrium module with generalized Ohm's law; (3) the NTCC Porcelli module to trigger sawtooth crashes; (4) the Globally Convergent Newton Method Parallel (GCNMP); (5) the TGLF and new Multi-Mode anomalous transport models; (6) a dynamic model for H-mode pedestal growth and ELM cycles, including the ELITE MHD stability code to compute the onset and width of ELM crashes; (7) standardized test problems to facilitate regression testing and cross-code verification studies; and (8) improvements to the performance and simulation control in PTRANSP.