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A modular, parallel, multi-region predictive transport equation solver, installed and available in PTRANSP XINGQIU YUAN, DOUGLAS MCCUNE, GREG HAMMETT, Princeton Plasma Physics Laboratory — In this presentation, we introduce a modular, parallel, multi-regional, implicit transport equation solver built over the Plasma State and other publicly available (NTCC) libraries. The solver has been installed, tested, and is available for use in predictive TRANSP (PTRANSP), but, the solver itself does not depend on PTRANSP internals and will itself be made publicly available through the NTCC website. In PTRANSP, the solver is used to integrate the highly nonlinear time-dependent equations for ion, and electron temperatures and densities, and angular momentum with implicit Newton iteration methods. The user controls choice of transport models attached to the solver, with a wide range of neoclassical and/or turbulent, or semi-empirical or data driven choices available. Available turbulent transport models include: MMM series, GLF23, and TGLF. For the more expensive transport coefficient models such as TGLF, a multi-level, communicator splitting method is used to parallelize the computation of transport coefficients using MPI, which allows the code to run on parallel supercomputers. In order to test and benchmark the code, PTRANSP code predicted temperature profiles have been compared to the experimental data, and good agreements have been achieved.

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