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Parallel computing aspect in TRANSP with PT-SOLVER¹ XINGQIU YUAN, STEVE JARDIN, GREG HAMMETT, ROBERT BUDNY, PPPL, GARY STAEBLER, General Atomics — We describe a new parallel predictive profile time-advance in the TRANSP code, PT-SOLVER, which has been developed during last two-years. A multilevel parallelization paradigm is implemented in PT-SOLVER, with the computationally intensive transport routines (such as NEO and TGLF) treated as independent components with their own communicators. The SOLVER component, which advances the transport equation, controls the other components for synchronization and communication. A communication layer is dynamically established to exchange the data from the SOLVER component to the turbulent and neoclassical transport components, and to collect the neoclassical and turbulent fluxes from their respective components. We demonstrate the massively parallel computational aspect of TRANSP by presenting results using over 1,000 cores on NSERC supercomputers. Parallel scaling properties are illustrated. PT-SOLVER is fully compatible with utilizing parallel versions of NUBEAM (for neutral beam and fusion products heating) and TORIC (for RF heating) in the same TRANSP simulation.

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