

Abstract Submitted
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Edge kinetic-MHD code coupling and monitoring with Kepler workflow JULIAN CUMMINGS, Caltech, SCOTT KLASKY, ROSELYNE BARRETO, ORNL, NORBERT PODHORSZKI, UC Davis, GUNYOUNG PARK, C.S. CHANG, NYU, LINDA SUGIYAMA, MIT, PHIL SNYDER, General Atomics, CENTER FOR PLASMA EDGE SIMULATION TEAM — Simulations of edge pressure pedestal buildup and ELM crash in a typical DIII-D H-mode discharge are performed using Kepler, an open-source scientific workflow system that manages complex applications. A Kepler workflow conducts an edge plasma simulation that loosely couples the kinetic code XGC0 with an ideal MHD linear stability analysis code ELITE and a two-fluid MHD initial value code M3D. XGC0 simulation data are processed by the workflow into simple graphs that may be selectively displayed via the Dashboard, a monitoring tool that allows real-time data tracking within a standard Web browser. Kepler runs ELITE to assess plasma profiles from XGC0 for linear ELM instability. If unstable, Kepler launches M3D to simulate the nonlinear ELM crash. Periodic outputs of plasma fluid quantities are automatically imaged and may be displayed on the Dashboard. Finally, Kepler archives all simulation output, processed images, and provenance tracking data. Preparation, execution, and monitoring of this coupled-code simulation using the Kepler scientific workflow system are described.

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