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**Advances in HYDRA and its application to simulations of Inertial Confinement Fusion targets** M.M. MARINAK, G.D. KERBEL, J.M. KONING, M.V. PATEL, S.M. SEPKE, P.N. BROWN, B. CHANG, R. PROCASSINI, Lawrence Livermore National Laboratory, S.A. VEITZER, Tech-X Corporation — We will outline new capabilities added to the HYDRA 2D/3D multiphysics ICF simulation code. These include a new $S_N$ multigroup radiation transport package (1D), constitutive models for elastic-plastic (strength) effects, and a mix model. A Monte Carlo burn package is being incorporated to model diagnostic signatures of neutrons, gamma rays and charged particles. A 3D MHD package that treats resistive MHD is available. Improvements to HYDRA's implicit Monte Carlo photonics package, including the addition of angular biasing, now enable integrated hohlraum simulations to complete in substantially shorter time. The heavy ion beam deposition package now includes a new model for ion stopping power developed by the Tech-X Corporation, with improved accuracy below the Bragg peak. Examples will illustrate HYDRA's enhanced capabilities to simulate various aspects of inertial confinement fusion targets.
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