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Development of an EMC3-EIRENE Synthetic Imaging Diagnostic[1] WILLIAM MEYER, STEVE ALLEN, CAMERON SAMUELL, Lawrence Livermore Natl Lab, JEREMY LORE, Oak Ridge Natl Lab — 2D and 3D flow measurements are critical for validating numerical codes such as EMC3-EIRENE. Toroidal symmetry assumptions preclude tomographic reconstruction of 3D flows from single camera views. In addition, the resolution of the grids utilized in numerical code models can easily surpass the resolution of physical camera diagnostic geometries. For these reasons we have developed a Synthetic Imaging Diagnostic capability for forward projection comparisons of EMC3-EIRENE model solutions with the line integrated images from the Doppler Coherence Imaging diagnostic on DIII-D. The forward projection matrix is 2.8 Mpixel by 6.4 Mcells for the non-axisymmetric case we present. For flow comparisons, both simple line integral, and field aligned component matrices must be calculated. The calculation of these matrices is a massive embarrassingly parallel problem and performed with a custom dispatcher that allows processing platforms to join mid-problem as they become available, or drop out if resources are needed for higher priority tasks. The matrices are handled using standard sparse matrix techniques.

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