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[ ] Theory [ x ] Experiment

**Synthetic Soft X-ray Imaging With 3D Perturbations in DIII-D,\*** M.D. Brown, *Arizona State U.*; A. Wingen, E.A. Unterberg, M.W. Shafer, *ORNL*; N.M. Ferraro, T.E. Evans, *GA* – A synthetic soft x-ray (SXR) diagnostic is applied to the DIII-D tokamak to model measurements of SXR emissions from the lower X-point and divertor region during an RMP (resonant magnetic perturbation) H-mode discharge with intermittent ELMs (edge-localized modes). The synthetic diagnostic takes into account the computed vacuum 3D magnetic field structure in the tokamak as well as linear, resistive, two-fluid MHD. The latter calculates self-consistently the plasma response to the applied RMP field. A 2–3 s time series is modeled. The evolution of the discharge is studied, especially focusing on the change in plasma response with evolving plasma parameters. Also ELMs reappear in the second half of the discharge. Therefore, the synthetic diagnostic may help to illuminate RMP ELM suppression. The latter is crucial to ELM control in ITER.

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