

**Abstract Submitted for the 54th Annual Meeting  
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Category Number and Subject: 5.6.2. DIII-D Tokamak

Theory     Experiment

**Influence of Plasma Response on Synthetic Soft X-ray Image for DIII-D,\*** A. Wingen, E.A. Unterberg, M.W. Shafer, *Oak Ridge National Laboratory*; N.M. Ferraro, T.E. Evans, *General Atomics* – A synthetic soft x-ray diagnostic is applied to DIII-D plasmas to model experimental measurements of soft x-ray emissions from the lower X-point and divertor region during applied resonant magnetic perturbations (RMPs). The synthetic soft x-ray diagnostic takes into account the modeled magnetic topology in DIII-D using the full soft x-ray emission spectra. A first approach to the magnetic topology is the vacuum approximation, which consists of an EFIT equilibrium reconstruction and the perturbation fields of the external coil systems. In H-mode plasmas the plasma response to externally applied RMPs is believed to strongly alter the magnetic structures as compared to the vacuum approximation. To take into account this self-consistent response, we use the M3D-C1 code, a non-ideal fluid MHD code. To analyze the influence of plasma response on the synthetic soft x-ray images, we investigate in detail the change in the magnetic topology between the vacuum approximation and the same case with the M3D-C1 plasma response included. In the next step, synthetic images are calculated for both cases. The synthetic images are compared to determine if the plasma response can be resolved.

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