

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Plasma Emission Profile Recreation using Soft X-Ray Tomography¹ J.W. PAGE, M.E. MAUEL, J.P. LEVESQUE, Columbia Univ — With sufficient views from multiple diode arrays, soft X-ray tomography is an invaluable plasma diagnostic because it is a non-perturbing method to reconstruct the emission within the interior of the plasma. In preparation for the installation of new SXR arrays in HBT-EP, we compute high-resolution tomographic reconstructions of discharges having kink-like structures that rotate nearly rigidly. By assuming a uniform angular mapping from the kink mode rotation, $\Delta\phi \approx \omega\Delta t$, a temporal sequence from a single 16-diode fan array represents as many as 16 x 100 independent views. We follow the procedure described by Wang and Granetz [1] and use Bessel basis functions to take the inverse Radon transform. This transform is fit to our data using a least-squares method to estimate the internal SXR emissivity as a sum of polar functions. By varying different parameters of the transformation, we optimize the quality of our recreation of the emission profile and quantify how the reconstruction changes with the azimuthal order of the transform.

[1] L. Wang and R.S. Granetz, Rev. Sci. Instrum. 62, 4 (1991)

¹Supported by U.S. DOE Grant DE-FG02-86ER53222.

James Page
Columbia Univ

Date submitted: 24 Jul 2015

Electronic form version 1.4