

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Performance Calculations for the ITER Core Imaging X-Ray Spectrometer (CIXS)¹ K.W. HILL, L. DELGADO-APARICIO, N. PABLANT, D. JOHNSON, R. FEDER, J. KLABACHA, B. STRATTON, Princeton Plasma Physics Laboratory, M. BITTER, Retired, P. BEIERSDORFER, Lawrence Livermore National Laboratory, R. BARNSELY, G. BERTSCHINGER, ITER Organization, M. O'MULLANE, Strathclyde University, UK, S.G. LEE, National Fusion Research Institute, Korea — The US is providing a 1D imaging x-ray crystal spectrometer system as a primary diagnostic for measuring profiles of ion temperature (T_i) and toroidal flow velocity (v) in the ITER plasma core ($r/a = 0-0.85$). The diagnostic must provide high spectral resolution ($E/\Delta E > 5,000$), spatial resolution of 10 cm, and time resolution of 10-100 ms, and must operate and survive in an environment having high neutron and gamma-ray fluxes. This work presents spectral simulations and tomographic inversions for obtaining local T_i and v , comparisons of the expected count rate profiles to the requirements, the degradation of performance due to the nuclear radiation background, and measurements of the rejection of nuclear background by detector pulse-height discrimination.

¹This work was performed under the auspices of the DOE by PPPL under contract DE-AC02-09CH11466 and by LLNL under contract DE-AC52-07NA27344.

Kenneth Hill
Princeton Plasma Physics Laboratory

Date submitted: 12 Jul 2013

Electronic form version 1.4