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Characterization of spatially resolved high resolution x-ray spectrometers for HEDP and light-source experiments[1] K.W. HILL, M. BITTER, L. DELGADO-APARICIO, P. EFTHIMION, N. PABLANT, Princeton Plasma Physics Laboratory, J. LU, Chongqing University, China, P. BEIERSDORFER, H. CHEN, E. MAGEE, Lawrence Livermore National Laboratory — A high resolution 1D imaging x-ray spectrometer concept comprising a spherically bent crystal and a 2D pixelated detector is being optimized for diagnostics of small sources such as high energy density physics (HEDP) and synchrotron radiation or x-ray free electron laser experiments. This instrument is used on tokamak experiments for measurement of spatial profiles of Doppler ion temperature and plasma flow velocity, as well as electron temperature. Laboratory measurements demonstrate a resolving power, $E/\Delta E$ of 10,000 and spatial resolution better than 10 μm. Good performance is obtained for Bragg angles ranging from 23 to 63 degrees. Initial tests of the instrument on HEDP plasmas are being performed with a goal of developing spatially resolved ion and electron temperature diagnostics.

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