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**X-ray Imaging for Plasma Position Control in the Ignitor Experiment\*** FRANCESCA BOMBARDA, ENEA, Italy, E. PAULICELLI, Università di Bari, Italy, B. COPPI, M.I.T. — In a burning plasma environment, traditional magnetic measurements may be expected to fail because of the high neutron and gamma radiation background. Light extraction and detection will also be more difficult than in present day tokamaks. In general, it will not be possible to keep detectors in the proximity and in direct view of the plasma. In this work we propose a diagnostic system for plasma position control using a multilayer mirror (MLM) as the dispersing element for the soft X-ray radiation emitted from the plasma outer region, and a Gas Electron Multiplier (GEM) detector. In the proposed layout, the radiation of the lower and upper region of the plasma is diffracted by cylindrical MLMs at shallow Bragg angles, and is collected by 2D detectors placed outside the machine horizontal port. GEM detectors are suitable for radiation in the 0.2-8 KeV range, and they are characterized by a very high counting rate. This system should measure the plasma position and detect any plasma movement with sufficient time resolution to be used for real-time feedback control of the vertical plasma position. \*Sponsored in part by ENEA and Università di Bari of Italy, and by the US DOE.

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