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A Heavy Ion Beam Probe for ASDEX Upgrade D.R. DEMERS, T.P. CROWLEY, P.J. FIMOGNARI, Xantho Technologies, LLC, Madison WI, G. BIRKENMEIER, A. HERRMANN, U. STROTH, and the ASDEX Upgrade Team, Max-Planck-Institute for Plasma Physics, Garching, Germany — A feasibility study of a heavy ion beam probe (HIBP) on the ASDEX Upgrade tokamak is being conducted. The diagnostic can target multiple critical issues associated with the H-mode pedestal region, including the mechanisms underlying the L-H transition, the formation of zonal flows, and the onset and evolution of ELMs. The HIBP is uniquely capable of measuring the radial electric field simultaneously with fluctuations of electron density and electric potential. Results of the feasibility study indicate that $\rho_{pol} > 0.8$ can be probed using a 500 keV Cs^+ beam. The high electron density and temperature that develop during H-mode in the outer region of the plasma are adequate to induce ionization of the beam and, consequently, produce sufficient signal levels which enable atypical operation as an edge diagnostic. Unique characteristics of the system include a relatively small beam Larmor radius and electrostatic deflection plates within AUG for redirecting secondary beam ions to the detector. Beam ion trajectories, the secondary deflection plate model, and measurement sensitivities for ϕ, $\tilde{n}/n$, and $\tilde{\phi}$ will be presented.

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