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Conceptual Design of a Heavy Ion Beam Probe for W7- X^1 P.J. FIMOGNARI, T.P. CROWLEY, D.R. DEMERS, Xantho Technologies, LLC, Madison, WI, O. GRULKE, R. LAUBE, Max Planck Institute for Plasma Physics, Greifswald, Germany — The conceptual design of a heavy ion beam probe (HIBP) for W7-X is in progress. The diagnostic is uniquely well suited to advancing understanding of particle and energy transport in optimized stellarators; it is able to simultaneously measure temporally and spatially resolved fluctuations of density and potential along with equilibrium electric potential and radial electric field from the plasma. The first steps in this design examine the inter-related issues of hardware interface and beam trajectory simulations. Beam trajectory simulations use the 3-D magnetic fields of W7-X to identify suitable beam energies, injection conditions, and cross-section of the plasma accessible to measurement. They also consider the available port pairs for the injection and detection of the ion beam, and location of the accelerator and energy analyzer. The implementation of the diagnostic on W7-X is anticipated during the second diagnostic phase (OP-2) and will use components of the 2MeV HIBP which was installed previously on the TEXT-U tokamak.

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