

Abstract Submitted  
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**The path to exploring physics in advanced devices with a heavy ion beam probe**<sup>1</sup> D.R. DEMERS, P.J. FIMOGNARI, Xantho Technologies, LLC  
— The scientific progression of alternative or advanced devices must be met with comparable diagnostic technologies. Heavy ion beam probe innovations from ongoing diagnostic development are meeting this challenge. The diagnostic is uniquely capable of measuring the radial electric field, critically important in stellarators, simultaneously with fluctuations of electron density and electric potential. HIBP measurements can also improve the understanding of edge physics in tokamaks and spherical tori. It can target issues associated with the pedestal region, including the mechanisms underlying the L-H transition, the onset and evolution of ELMs, and the evolution of the electron current density. Beam attenuation (and resulting low signal to noise levels), a challenge to operation on devices with large plasma cross-sections and high  $n_e$  and  $T_e$ , can be mitigated with greater beam energies and currents. Other application challenges, such as measurements of plasma fluctuations and profile variations with elevated temporal and spatial resolutions, can be achieved with innovative detectors. The scientific studies motivating the implementation of an HIBP on HSX, ASDEX-U, and W7-X will be presented along with preliminary scoping studies.

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