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Heavy Neutral Beam Probe Development and Space Poten tial Measurements of Helimak ALVARO GARCIA DE GORORDO, GARY A. HALLOCK, KENNETH W. GENTLE, The University of Texas at Austin — The Heavy Neutral Beam Probe (HNBP) is an extension of the Heavy Ion Beam Probe that can probe plasmas with low electron temperature and densities. The HNBP's beam operates at $U \simeq 10\,keV$, and the probing ions, Na, are neutralized in a Cs based neutralizer. Even with Na neutrals, the signal current is low (tens of nanoAmperes), and so a phase sensitive detection system is used to raise low frequency signals out of the noise by modulating the neutral Na beam. The HNBP has been specifically developed for measuring the Helimak plasma device, which is an approximation to the infinite cylindrical slab with open field lines. We will present measurements of the plasma potential accross magnetic field lines and along the direction of various gradients including density, temperature, and magnetic field strength gradients. These are the first space potential measurements of a plasma of electron temperature below $T_e \simeq 40\,eV$; the Helimak's HNBP is extending beam probing to the $T_e \simeq 10\,eV$ regime.

Alvaro Garcia de Gorordo
The University of Texas at Austin

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