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Magnetic Diagnostics at the Wisconsin Plasma Astrophysics Laboratory ETHAN PETERSON, MICHAEL CLARK, JAN EGEDAL, JOHN WALLACE, DAVID WEISBERG, CARY FOREST, University of Wisconsin - Madison — A flexible suite of magnetic diagnostics is being developed to measure low and high frequency magnetic fields, the 3-D magnetic field structure throughout the plasma volume, and the 2-D structure (polar and azimuthal fields) on the surface of the sphere. The internal 3-D structure is ascertained by scanning insertion probes with high sensitivity, high bandwidth, 3-axis hall effect sensors. Careful engineering of these insertion probes is required to effectively remove the heat load while simultaneously maintaining high performance (hot, dense, steady state) plasmas. A surface array of 3-axis hall-effect sensors and 2-axis flux loops will provide 3-D, low frequency magnetic field measurements as well as high frequency fluctuations in the polar and azimuthal directions due to plasma waves. This surface array can be used to observe the spatial structure of global modes such as spherical ion acoustic waves and can provide insight into the structure and magnitude of internal plasma flows. The engineering and capabilities of these diagnostics is the focus of this poster.

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