

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**5-D Kinetic Modeling of ECH Plasmas in the HSX Stellarator<sup>1</sup>**

J.W. RADDER, K.M. LIKIN, J.N. TALMADGE, D.T. ANDERSON, HSX Plasma Laboratory, University of Wisconsin-Madison, USA, S. MURAKAMI, Department of Nuclear Engineering, Kyoto University, Kyoto, Japan — The HSX electron cyclotron heating (ECH) system is being upgraded to two 200 kW, 28 GHz gyrotron sources. This new system will allow increased total available ECH power as well as increased heating flexibility with a poloidally steerable launch assembly. Kinetic simulations using the global transport code GNET will model the evolution of the perturbed electron distribution function and radial electron transport due to ECH. GNET solves a linearized drift kinetic equation in five-dimensional phase space, allowing simulations of quasihelically symmetric (QHS) as well as asymmetric magnetic configurations. GNET will be used to determine ECH-driven electron fluxes and estimate modifications to the ambipolar radial electric field obtained from neo-classical theory. GNET calculations will be presented for 2<sup>nd</sup>-harmonic X-mode at 0.5 Tesla and 1<sup>st</sup>-harmonic O-mode at 1.0 Tesla operations. Implications for ECE and X-ray diagnostics will also be presented.

<sup>1</sup>This work is supported by DOE grant number DE-FG02-93ER54222.

Jerahmie Radder  
HSX Plasma Laboratory, University of Wisconsin-Madison

Date submitted: 20 Jul 2008

Electronic form version 1.4