Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

A Charge-Exchange Neutral Particle Analyzer for an Inertial Electrostatic Confinement Fusion Device[1] GABRIEL BECERRA, GERALD KULCINSKI, JOHN SANTARIUS, GILBERT EMMERT, University of Wisconsin-Madison — An electrostatic energy analyzer for outgoing charge-exchange neutral particles has been designed and constructed for application on HELIOS, an inertial electrostatic confinement (IEC) fusion device designed for advanced fuel studies. Ions are extracted from an external helicon plasma source and subsequently accelerated radially into an electrostatic potential well set up by a semi-transparent cathode grid inside the HELIOS spherical chamber. Analysis of fast neutrals produced by charge exchange between energetic ions and background gas yields information on primary ion energy spectra, as well as a quantitative measure of charge exchange as an energy loss mechanism in IEC devices. Preliminary data with helium is used to benchmark the two-charge-state helium formalism of VICTER, a numerical code on spherically convergent ion flow, as it relates to IEC operation with helium-3 fuel.

[1]Research supported by the Greatbatch Foundation.

Gabriel Becerra
University of Wisconsin-Madison

Date submitted: 11 Jul 2013 Electronic form version 1.4