Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

External Kink Mode Feedback: Analysis and Results JEREMY HANSON, BRYAN DEBONO, ROYCE JAMES, JEFFEREY LEVESQUE, MICHAEL MAUEL, DAVID MAURER, GERALD NAVRATIL, THOMAS PEDERSEN, DAISUKE SHIRAKI, Columbia University — The details of the implementation of the HBT-EP Kalman filtering feedback system will be presented in this poster. Feedback control of external kink modes on HBT-EP is accomplished using arrays of poloidal sensor coils, and small, localized, radial control coils. The control algorithm uses spatial and temporal filtering in series with a Kalman filter that isolates the $n = 1$ mode from background noise. The Kalman filter compares measurements of the kink mode with an internal model to make an optimal estimate for the mode's amplitude and phase. Supplementary diagnostics include a poloidal array of Mirnov coils (separate from those used in feedback), radial Hall and triple probe arrays, and a multi-tip Mach probe. Digital, low-latency field programmable gate arrays (FPGAs) are used as controllers. Two singular value decomposition (SVD) based techniques are used to measure the effectiveness of feedback and qualify the behavior of the external kink mode. *Supported by U. S. DOE Grant DE-FG02-86ER53222.

Jeremy Hanson
Columbia University

Date submitted: 22 Jul 2008 Electronic form version 1.4