

Abstract Submitted  
for the DPP13 Meeting of  
The American Physical Society

**Modeling and Control of Plasma Rotation for the NSTX using the Neoclassical toroidal viscosity** IMENE GOUMIRI, Princeton University, STEVEN SABBAGH, DAVID GATES, PPPL, CLARENCE ROWLEY, Princeton University, STEFAN GERHARDT, PPPL — A one-dimensional plasma model and its controller for a magnetically confined fusion device are developed in an effort to assist the continuous extraction of fusion energy. In particular, this study is based on the experimental measurements from the National Spherical Torus Experiment (NSTX) and is aimed to capture the rotation (toroidal) momentum transport inside the tokamak. The neutral beam injection being fixed, the neoclassical toroidal viscosity will be considered in our model as the actuator. Based on the proposed model, a feedback controller is designed to sustain the toroidal momentum of the plasma in a stable fashion and to achieve desirable plasma geometry.

Imene Goumiri  
Princeton University

Date submitted: 21 Jul 2013

Electronic form version 1.4