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Neoclassical bootstrap current models for describing NSTX plasmas MATTHEW PARSONS, Undergraduate Physics, Drexel University, Philadelphia, PA — In the study of magnetically confined fusion plasmas, the motion of particles and energy across magnetic field lines can be described by neoclassical transport theory. For the toroidal magnetic geometry of a tokamak reactor, one of the main results of this theory is the generation of a current as a result of interaction between trapped and passing particles. This so-called bootstrap current is of particular interest because it generates an additional component to the magnetic field which helps to confine particles to the center of the reactor. Here, a neoclassical transport code is used to calculate the bootstrap current based on several experimental plasma profiles from the National Spherical Torus Experiment, and the results are compared to several classic models to examine whether any of them sufficiently describe the simulated bootstrap current profiles.

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