

An Overview of the Five Year Plan for NSTX Research in 2004 – 2008 – E.J.

Synakowski, PPPL – Recent progress in NSTX research is motivating the research team to develop elements of a research plan that will address issues of fundamental concern to the progress of the ST. This plan is aimed at assessing the attractiveness of the ST as a fusion energy concept, as well as taking advantage of scientific opportunities afforded by the unique ST field line geometry and the development of high beta operating scenarios. With respect to these scenarios, this plan has two primary goals. One is the development of non-inductively sustained plasmas at beta and confinement values relevant to a component test facility, as well as the development of solenoid-free startup techniques. These plasmas should be maintained for several current relaxation times. The other is the development of very high beta operating regimes (up to 40% toroidal beta) with good confinement and high fractions of bootstrap current, also sustained for times longer than a current diffusion time. The development of these scenarios is to be grounded in a physics-based understanding of MHD, transport, wave/particle interactions, boundary physics, and associated advanced control strategies that is sufficient to enable reliable extrapolation of these results to next-step devices. In this talk, an overview of the goals, and the strategy for achieving them, will be described.