



## Proposal and Attendance Form for NSTX Research Forum 2001

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**Please write in the boxes below a one-page abstract of your proposal to be presented:**

**Title: Peculiarities of Particle Orbits and Wall Load in High- $\beta$  Plasmas of STs**

**Abstract:** Using a model representation of the magnetic field in a high- $\beta$  discharge of a spherical tokamak, the dependence of the topology and the shape of particle orbits on constants of the particle motion (the canonical angular momentum,  $J$ , and the magnetic moment,  $\mu$ ) and parameters of the magnetic field is investigated. Analytical expressions are derived for the curves that separate the regions of orbits of different shape and topology on the  $(J, \mu)$  plane. Special attention is paid to the orbit types that do not exist in standard tokamaks ("tear drops", "dumb-bells"), as well as unusual shape of orbits of trapped and circulating particles. It is found that the orbits of unusual shape constitute a significant fraction of the particle population. The obtained results indicate that the unusual shape of orbits in the peripheral region may result in the poloidal distribution of the wall load that differs from that in low- $\beta$  plasmas. Further investigation is required to study peculiarities of the wall load produced by escaping charged particles. Such work is in progress.

<p>Choose only one topical session by inserting X for each proposal (Use separate forms for separate proposals)</p>	<p><b><u>2000 Results</u></b> (<a href="mailto:mbell@pppl.gov">mbell@pppl.gov</a>)  <b>&amp; 2001 Research Program</b> (<a href="mailto:esynakowski@pppl.gov">esynakowski@pppl.gov</a>)          (Please submit by January 10, 2001)</p> <p><input type="checkbox"/> ET1: Macroscopic Stability  <input type="checkbox"/> ET2: Transport &amp; Turbulence  <input type="checkbox"/> ET3: High Harmonic Fast Wave &amp; Electron Bernstein Wave  <input type="checkbox"/> ET4: Coaxial Helicity Injection  <input type="checkbox"/> ET5: Boundary Physics</p> <p><b><u>2002-2005 Research Opportunities</u></b> (<a href="mailto:mpeng@pppl.gov">mpeng@pppl.gov</a>)          (Please submit by January 11, 2001)</p> <p><input type="checkbox"/> TG1: Noninductive Startup  <input type="checkbox"/> TG2: Heating, Current Drive &amp; Fueling  <input type="checkbox"/> TG3: Macroscopic Stability  <input type="checkbox"/> TG4: Transport &amp; Turbulence  <input checked="" type="checkbox"/> TG5: Energetic Particle Physics  <input type="checkbox"/> TG6: Multiphase Interface (Boundary Physics)</p> <p><b><u>Fluctuations Measurement</u></b> (<a href="mailto:esynakowski@pppl.gov">esynakowski@pppl.gov</a>)          (Please submit by January 10, 2001)</p> <p><input type="checkbox"/> Fluctuations Measurement proposals</p>
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