



## Proposal and Attendance Form for NSTX Research Forum 2001

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Co-authors	S. Zweben, G. Wurden, et al.

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

**Title: Fast Visible Imaging of Edge Plasmas for Wall Condition Studies**

**Abstract:**

Wall conditions, and by extent plasma-surface interactions, are a known but yet no well understood, and furthermore non-explored, variable for accessing improved confinement regimes such as H-modes and supershots (S. Zweben presentation, this Session). We propose to use a fast-framing, visible, intensified digital camera to quantify and study the surface conditions and plasma interactions that lead, or not, to improved confinement. Small regions within ~15 cm of the first wall of the divertor region(s), center stack, limiters (antenna and beam-dump) and passive plates will be imaged with high resolution using either a Kodak EM1012 camera (i.e., Los Alamos fast camera) or a new, higher resolution, intensified system based on a Phantom V.4 fast-framing camera. Intensification is required in order to be able to use interference filters for deuterium Balmer lines ( $D_2$  recycling), low ionization carbon lines (impurity generation), or low ionization boron or lithium lines (wall conditioning). Access ports to image these surfaces with appropriate tangential views still need to be worked out but may involve re-entrant flexible bellows and removable coherent fiber bundles.

The tangential views will yield images suitable for 2-D profile inversion of the measured brightness (assuming toroidal symmetry). The camera will also be absolutely calibrated to convert the brightness profiles into emissivity profiles. In addition, a system of beam splitters will be implemented to record, in each detector exposure, two simultaneous "side-by-side" images of the same view but with different interference filters. The inferred emissivity profiles corresponding to the "two-color" images will then be used, in conjunction with spectroscopic models, to further infer parameters of the edge plasma (densities, temperatures, etc.).

<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><u>&amp; 2001 Research Program</u></b> (<a href="mailto:esynakowski@pppl.gov">esynakowski@pppl.gov</a>) (Please submit by January 10, 2001)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> ET1: Macroscopic Stability</li><li><input type="checkbox"/> ET2: Transport &amp; Turbulence</li><li><input type="checkbox"/> ET3: High Harmonic Fast Wave &amp; Electron Bernstein Wave</li><li><input type="checkbox"/> ET4: Coaxial Helicity Injection</li><li><input type="checkbox"/> ET5: Boundary Physics</li></ul> <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> <ul style="list-style-type: none"><li><input type="checkbox"/> TG1: Noninductive Startup</li><li><input type="checkbox"/> TG2: Heating, Current Drive &amp; Fueling</li><li><input type="checkbox"/> TG3: Macroscopic Stability</li><li><input type="checkbox"/> TG4: Transport &amp; Turbulence</li><li><input type="checkbox"/> TG5: Energetic Particle Physics</li><li><input checked="" type="checkbox"/> TG6: Multiphase Interface (Boundary Physics)</li><li><input type="checkbox"/> TG7: Plasma Science User Research</li></ul> <p><b><u>Fluctuations Measurement</u></b> (<a href="mailto:esynakowski@pppl.gov">esynakowski@pppl.gov</a>) (Please submit by January 10, 2001)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Fluctuations Measurement proposals</li></ul>
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**Select a presentation option by inserting X:**

- Oral presentation in person
- Remote presentation via ShowStation and speakerphone
- Ask discussion leader to include in discussion
- No need to present, but include in meeting summaries
- Attend Forum only

**Special Requests for your proposal (projector type, time constraints, etc.):**

After S. Zweben presentation in same Session.

Please return this document via e-mail attachment to [jrobinson@pppl.gov](mailto:jrobinson@pppl.gov), [jsavino@pppl.gov](mailto:jsavino@pppl.gov), and the corresponding organizer listed above. Please e-mail questions or comments to the organizers listed above.