

Abstract Submitted  
for the DPP10 Meeting of  
The American Physical Society

**ITER low-field-side density profile reflectometer: design challenges and optimization**<sup>1</sup> W.A. PEEBLES, T.L. RHODES, E.J. DOYLE, G. WANG, X. NGUYEN, C. WANNBERG, UCLA, G. HANSON, T. BIGELOW, J. WILGEN, ORNL — Ensuring the availability, reliability and accuracy of profile, MHD and turbulence measurements in ITER represents a significant challenge. In contrast to optically-based diagnostics, millimeter-wave systems are well-suited to the harsh burning plasma environment. However, a number of design issues remain including cutoff layer modifications due to relativistic effects at high temperatures, diagnostic availability/accessibility for a range of operating conditions/plasma positions, and minimization of phase errors introduced through antenna coupling/mode conversion in overmoded corrugated waveguide. Design issues such as this have been addressed through analysis coupled with laboratory measurements. An optimized conceptual design of the front-end antenna configuration has been generated together with an assessment of the expected accuracy of the density profile measurement.

<sup>1</sup>Supported by US ITER and PPPL under Subcontract S008905.

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Date submitted: 14 Jul 2010

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