

Abstract Submitted
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Microwave Interferometer for the Levitated Dipole Experiment¹

A.C. BOXER, J. KESNER, MIT PSFC, M.E. MAUEL, D.T. GARNIER, A.K. HANSEN, Columbia University — Measuring and understanding the evolution of the plasma density is an important goal for the Levitated Dipole Experiment (LDX). Theoretical considerations suggest that the density profile may naturally evolve to a highly peaked profile with $\delta(nV) \sim 0$, or $n \sim 1/r^4$. Knowledge of the density profile is also necessary for the reconstruction of the overall equilibrium parameters of the confined plasma. In LDX we have built and tested the first channel of a multi-cord interferometer diagnostic using heterodyne receivers at 60 GHz. Using the single-cord interferometer, we have documented the rapid density rise that coincides with the transition from low-density to high beta operation. In the high-beta regime, the line-averaged density is approximately $3 \times 10^{10} \text{ cm}^{-3}$. Construction has begun on the additional channels that will allow measurement of the density profile and investigation of density profile evolution caused by plasma phenomena.

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