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Plasma Density Gradient Profiles of Unconstrained CTs with an Array of Laser Deflectometers on CTIX SAMUEL BROCKINGTON, UC-Davis Electrical Engineering, DAVID HWANG, UC Davis Applied Science, ROBERT HORTON, STEPHEN HOWARD, RUSS EVANS, PETER BEIERSDORFER, Lawrence Livermore National Lab — The Compact Toroid Injection Experiment (CTIX) is a plasma accelerator which can create compact toroid (CT) plasmas of controllable density and velocity. A CT is constrained by conducting walls during acceleration, but can be accelerated into a larger viewing chamber where the CT becomes unconstrained and is allowed to travel through free space. Since a laser deflectometer is a non-invasive line-integrated plasma density gradient diagnostic, an array of laser deflectometers at the viewing section of CTIX could profile density gradients of passing CTs in two dimensions with perturbing the plasma. A survey of density gradient profiles in two dimensions of unconstrained CTs traversing free space was conducted with an array of four temperature controlled laser deflectometers. These profiles of plasma density gradient were then used to estimate CT density profiles and CT total mass.

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