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Electron Beam Radiography as a Proposed Plasma Diagnostic ERIK VOLD, JEREMY MARGULIES, FRANK MERRILL, ERIC NELSON, FRED WYSOCKI, Los Alamos National Lab — Several recent studies have shown that charged particle diagnostics of ICF implosions provide new and useful information on the capsule implosion and the E and/or B fields associated with the finite scale plasma structures. Possible mechanisms for the plasma self-generation of these fields have been discussed but are not fully clear. In the present study, an electron beam (eBeam) radiography system (30MeV) is proposed which may have significant advantages over the existing methods which use 15 MeV nuclear-fusion driven protons as the charged particle diagnostic "point" source. The relativistic electron beam has a greater penetration (cm2/g) and is predicted to have improved deflection from E or B relative to the scattering from multiple coulomb collisions. The scattering determines the plasma density image but simultaneously contributes noise to the signal due to E or B deflections. On-going studies focus on the forward calculation of the eBeam through simple plasma and test objects. The self-consistent generation of the E or B fields in the dynamic transient plasma may require new computational tools to explicitly include multi-species plasma in the presence of E or B fields and to resolve the mixing structures at the fuel-capsule interface in ICF implosions.

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