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Phase Space Tomography and Slice Emittance Measurement of Beams with intense Space Charge[1] DIKTYS STRATAKIS, RAMI KISHEK, KAI TIAN, RALPH FIORITO, IRVING HABER, BRIAN BEAUDOIN, MARK WALTER, MARTIN REISER, PATRICK O'SHEA, Institute for Research in Electronics and Applied Physics — We report a simple and portable tomographic method to map the beam phase space, which can be used in the majority of accelerators. The tomographic reconstruction process has first been compared with results from simulations using the particle-in-cell code WARP and the results show excellent agreement. Our diagnostic has also been successfully demonstrated experimentally on simple scaled set-up which uses high-current, low energy electron beams to study the transverse dynamics of beams in both emittance and space charge dominated regimes. Finally, using a fast (<5ns decay time) phosphor screen and a gated PI-MAX2 ICCD camera we report slice tomographic measurements of transverse phase spaces over a beam pulse and conclude by deriving interesting physical insights on space charge dynamics.

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