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Millimeter-wave to near-infrared radiometry and collective Thomson scattering for studies of power balance in COBRA gas puff pinch plasmas[1] THOMAS SCHMIDT, MARK GILMORE, EDL SCHMILOGLU, University of New Mexico, COBRA COLLABORATION — Radiometer diagnostics from millimeter-wave to near-infrared bands and collective Thomson scattering diagnostics are being developed in order to characterize radiated power and turbulent density fluctuations in gas puff plasmas in the COBRA accelerator at Cornell University. The purpose of these measurements will be to study the overall power balance in COBRA plasmas under various conditions. An initial millimeter-wave radiometer channel will operate in the 94 GHz range, and three near-infrared channels will operate at 1100, 1310, and 1550 nm. The multiple channels in IR along with an envisioned expansion of the millimeter-wave radiometer to a number of channels covering the 10-300 GHz range will allow for a detailed characterization of emission vs frequency across both the IR and microwave band. The coherent Thomson scattering system will operate at 1064-1550 nm in the Bragg scattering limit, with detection at several scattering angles in order to characterize the evolution of the density fluctuation spectrum in terms of amplitude and wavenumber. Diagnostic system design, data, and results will be presented.

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