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Incoherent Thomson Scattering System for Laboratory Space Plasma on PHASMA Device[1] PEIYUN SHI, EARL SCIME, PRABHAKAR SRIVASTAVA, RIPUDAMAN SINGH NIRWAN, CUYLER BEATY, THOMAS STEINBERGER, West Virginia University, SCIME'S LAB TEAM — The PHASMA (PHAse Space Mapping) experiment is designed to simulate space plasma in laboratory, including magnetic reconnection through the merger of two flux ropes from two biased gun plasmas. A new incoherent Thomson scattering system will measure the evolution of electron velocity distribution functions perpendicular and parallel to the ambient magnetic field during the magnetic reconnection process. These will be some of the first measurements of bulk electron acceleration and heating in laboratory magnetic reconnection. The Thomson scattering system provides sub-millimeter spatial resolution; sufficient to diagnose the several millimeters sized magnetic reconnection electron diffusion region in PHASMA. Due to the relatively modest plasma density ˜1019 m-3 and electron temperature ˜10 eV, the challenge for the Thomson scattering system is suppressing stray light at the laser wavelength 532 nm while collecting enough scattered photons. To address this challenge, two Volume Bragg Gratings are used in series as a notch filter with spectral bandwidth <0.1 nm and optical density OD7. An intensified CCD with Gen III intensifier of peak quantum efficiency >47% is also used as the detector in a 1.3 m spectrometer. Preliminary results of gun plasma electron temperature will be reported and compared with measurements obtained from a triple Langmuir probe.

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