# Measurement of Collective Thomson-Scattering Spectra with Continuous Angular Resolution

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A collective Thomson-scattering diagnostic with continuous angular resolution over a span of 120° has been developed for characterization of plasmas produced at the Omega Laser Facility. Spectrally resolving light scattered from electron plasma wave features as a function of emission angle provides a means to effectively probe a large range of plasma frequencies and k vectors. Together, these spectra contain critical constraints to the plasma physics models used to interpret the data and enable experimental measurements of the electron velocity distribution function (EDF) without assumptions to its mathematical form. Major components of the instrument include (1) a reflective collection objective that gathers light over a range of 120° × 12°; (2) a spatial filter image relay for measurement localization; (3) cylindrical optics for producing a line image of the collection aperture; (4) a transmission grating spectrometer; and (5) a time-gated, image-intensified camera. Initial experiments examined the properties of the EDF in gas-jet–produced plasmas in the presence of heating via inverse bremsstrahlung absorption.[1]

This material is based upon work supported by the Department of Energy [National Nuclear Security Administration] University of Rochester "National Inertial Confinement Fusion Program" under Award Number(s) DE-NA0004144.

[1] A. L. Milder, J. Katz, R. Boni, J. P. Palastro, M. Sherlock, W. Rozmus, and D. H. Froula Phys. Rev. Lett. **127**, 015001 (2021).