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12.36 Developing an experimental platform for collective x-ray Thomson scattering measurements from capsule implosions at the NIF *

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We are developing an experimental platform at the NIF to measure x-ray Thomson scattering (XRTS) spectra from indirectly-driven capsule implosions [1]. Recent efforts focus on measuring XRTS at scattering angles as small as 30 degrees, where the spectra become sensitive to collective excitations (plasmons). Such measurements provide improved sensitivity to temperature, and also show promise to obtain information on collision rates. One key requirement is to improve the spectral resolution of the measurement by reducing the spectral bandwidth of the x-ray source. Here, we take advantage of the fact the the Cu K-edge at 8.975 keV is located exactly between the two lines of the Zn He-alpha doublet. We use two NIF quads to produce He-like emission from a thermal Zn plasma, which is then filtered by a Cu foil, located at 1.5 mm from the Zn foil. We will discuss first x-ray source tests and potential heating sources that could impact the efficiency of the K-edge filtering.
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[1] D. Kraus et al., J. Phys.: Conf. Series 717, 012067 (2016).

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