

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

X-ray Thomson Scattering using the Hybrid X-pinch X-ray Source CAD HOYT, SERGEI PIKUZ, TANIA SHELKOVENKO, DAVE HAMMER, Cornell University — Stringent photometric and bandwidth requirements have historically relegated X-ray Thomson scattering (XRTS) probe sources to high energy laser plasma sources or free electron lasers. Standard x-pinch configurations in which two or more fine wires cross and subtend an angle of about 30° forming an “X” between the anode and cathode of a pulsed power generator can produce extremely bright, subnanosecond bursts of continuum and line radiation from micron-scale sources. The hybrid x-pinch is a new configuration based on conical W-Cu alloy electrodes with a short 1-2mm gap that is bridged by a fine wire resulting in an easier to load setup with improved performance characteristics. We explore the possibility of utilizing the hybrid x-pinch as a novel XRTS probe source by examining certain spectral and temporal attributes of a range of materials in a hybrid x-pinch configuration on the XP (500kA, 50ns) and COBRA(1MA, 100ns) pulsed power generators. We find that a Ti hybrid x-pinch produces $>10^{12}$ photons/sr in Ti He-alpha radiation and satisfies the noncollective scattering bandwidth requirement. Measurements of photon fluence, bandwidth and applicability to the relevant scattering regime and initial scattering results will be presented.

Cad Hoyt
Cornell University

Date submitted: 12 Jul 2013

Electronic form version 1.4