Abstract Submitted
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Characterization of a quartz crystal for X-ray spectropolarimetric plasma diagnostics[1] MATT WALLACE, University of Nevada, Reno, NINO PEREIRA, Ecopulse, Inc., ALAN KASTENGREN, Argonne National Laboratory, APS, RADU PRESURA, University of Nevada, Reno — The x-rays emitted by the plasma an electron beam passes through can be polarized. Information about the anisotropy of the electron energy distribution can be reveled by the x-ray spectrum's polarization. A promising way of performing spectropolarimetry uses one crystal containing two sets of planes that, for the appropriate wavelength and incidence angle, diffract the incident x-rays in two directions that are perpendicular to each other and to the incident beam.[2] The diffracted x-rays are linearly polarized perpendicularly to each other. Polarization splitting quartz crystals were tested with the linearly polarized x-rays from the Advanced Photon Source. A crystal with surface cut [10-10] that splits polarization with [11-20] planes at 3.5 keV was among those tested. This can be used for plasma containing Cl, Ar, or K. The crystal characteristics and requirements for its use to diagnose electron beams in z-pinch plasmas will be presented.

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[2]E O Baronova and M M Stepanenko, "A novel x-ray polarimeter based on hexagonal crystal, for application to thermonuclear fusion experiments," Plasma Phys. Control. Fusion 45 1113(2003)

Matt Wallace
University of Nevada, Reno

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