

**INITIAL EXPERIMENTS WITH A STREAKED  
SPHERICALLY BENT CRYSTAL X-RAY  
SPECTROMETER ON THE COBRA PULSED POWER  
GENERATOR\***

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X-ray spectroscopy is an invaluable tool for diagnosing the conditions of high energy density plasmas in the laboratory. A time integrated, space-resolved spectrometer, known as the WB-FSSR<sup>1</sup>, is routinely used on the 1 MA COBRA to estimate density and temperature of the various high energy density (HED) plasmas that are produced. However, time-resolved spectroscopy is difficult to implement and has not been routinely used to this date. We present here the design and setup of an x-ray streak camera equipped with a spherically bent crystal spectrometer for time resolved studies of the HED plasmas generated on COBRA. We outline the techniques used to focus, align and synchronize the camera. The spectral and temporal resolution of the system is estimated both theoretically and for the actual experimental arrangement. The degradation of resolution due to imperfect focusing in the electron optics and photocathode quality is discussed. Preliminary results are shown and compared with time-integrated spectra obtained on the same experiments. Finally, applications and future plans for time-resolved spectroscopy on COBRA are presented.

1. S. A. Pikuz et al., "Wide band focusing x-ray spectrograph with spatial resolution", *Rev. Sci. Instrum.* **79**, 013106 (2008).

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