

Emittance Measurement at NSLS X-Ray Ring *,
J. SAFRANEK, P. STEFAN, BNL - A pinhole camera was used to image x-ray synchrotron radiation from a dipole magnet in the NSLS X-Ray Ring. The pinhole camera detector was a 4 μm thick YAG phosphor screen viewed by a video camera. Both the theoretical pinhole diffraction pattern and the measured modulation transfer function (MTF) of the phosphor and camera were deconvolved from the measured profile in order to derive the true transverse profile of the electron beam. This profile was then fit to a 2-dimensional gaussian. The electron beam emittance as a function of the phase space acceptance of the pinhole camera was derived, so the horizontal and vertical electron emittances could be deduced from the major and minor sigmas of the fit gaussian. The ratio of the measured vertical to horizontal emittance was 0.16 percent.

* Work performed under the auspices of the U.S. Department of Energy.