

A Possible Synchrotron Light Beam Profile Monitor in RHIC*, E. COURANT, S. PEGGS, D. TRBOJEVIC, BNL - This report examines a possibility of observing transverse beam profiles by using the synchrotron light emission from the 100 GeV/nucleon heavy-ion gold beam in the Relativistic Heavy Ion Collider (RHIC). Synchrotron radiation experiences a shift towards higher photon energy when the magnetic field at the end of a dipole varies rapidly over a short distance. Synchrotron light signals from high energy (larger than 400 GeV) proton beams have already been routinely used to observe the transverse beam profiles at the SPS in CERN and at the TEVATRON at Fermilab. Because of the modest relativistic factor of the fully stripped stored gold ions in RHIC this "push" towards higher critical energy is not large enough to place the synchrotron light within the visible region of the spectrum. The critical wavelength remains within the infra-red region. A 77K cooled infrared array detector with 160 elements, made of PbSe (Lead Salt) could be used for beam profile detection. It would cover the wave-length range between 1 and 6 microns, with the maximum sensitivity at a wavelength of 4.5 microns.

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