

## EMITTANCE EXCHANGE AT THE FERMILAB A0 PHOTOINJECTOR

T.W. Koeth, Rutgers University, The State University of New Jersey, Piscataway, New Jersey;  
L. Bellantoni, H.T. Edwards, R.P. Fliller, A.S. Johnson, A.H. Lumpkin, J. Ruan, R. Thurman-Keup,  
Fermilab, Batavia, Illinois

### Abstract

An experiment has been developed at the Fermilab A0 Photoinjector Lab to demonstrate the exchange of longitudinal emittance with the horizontal emittance. Our apparatus consists of a 3.9 GHz TM110 deflecting rf cavity placed between two magnetic dogleg channels. The first dogleg generates the needed dispersion to appropriately position the off-momentum electrons in the TM110 cavity. The TM110 cavity reduces the momentum spread and imparts a time dependent transverse kick. The second dogleg finishes the exchange and yields the exchange of the emittances. We report on the measurement of the exchange beamline matrix elements as well as an initial report on measuring the exchange emittances directly.

**PERMISSION TO  
VIEW THE SLIDES  
NOT GRANTED BY  
THE SPEAKER**