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Beam Instrumentation for High Pressure RF Cavity Experiment at Fermilab MuCool Test Area

At MuCool Test Area (MTA) of Fermilab, an experiment has been performed with an RF cavity filled with high pressure hydrogen gas to study beam loading effects. In this experiment a 400 MeV proton beam is used with an external magnetic field of B=3 T. Quantitative information about the number of protons passing through the cavity is an essential requirement of the beam test. We have developed beam diagnostic instrumentation using a combination of a Chromox-6 scintillation screen and CCD camera. This paper describes quantitative measurements of the beam size and transmission efficiency through a collimator with B=0 T and B=3 T, and for high and low intensity proton beams.

Primary author: Dr JANA, MUKTI RANJAN (Fermi National Accelerator Laboratory)

Presenter: Dr JANA, MUKTI RANJAN (Fermi National Accelerator Laboratory)