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

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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.

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