

Texas A&M Cyclotron K150 radiation effects facility
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Several improvements have been made to the Radiation Effects Facility K150 beam line. Improvements include the installation of a backscatter measurement system to conduct high-flux dosimetry and the installation of a beam energy degrader system.

The backscatter measurement system consist of a set of four tantalum foils and four detectors aligned to measure backscattered protons from the foils. The foils are placed perpendicular to the beam path at 90° intervals radially about the beam line center. The detectors, consisting of plastic scintillators coupled to photomultiplier tubes, are angled to face the foils and are located out of the beam path. Beam uniformity is first adjusted at a lower beam flux ($< 1E7$ part/cm²/s) and then a calibration measurement is taken, measuring the ratio of backscattered counts to counts from the forward facing central detector. High-flux live dosimetry is conducted using this calibration measurement and live counts from the backscatter detectors.

A rotatable degrader wheel has been installed after the exit window of the beam line (see Fig. 1).

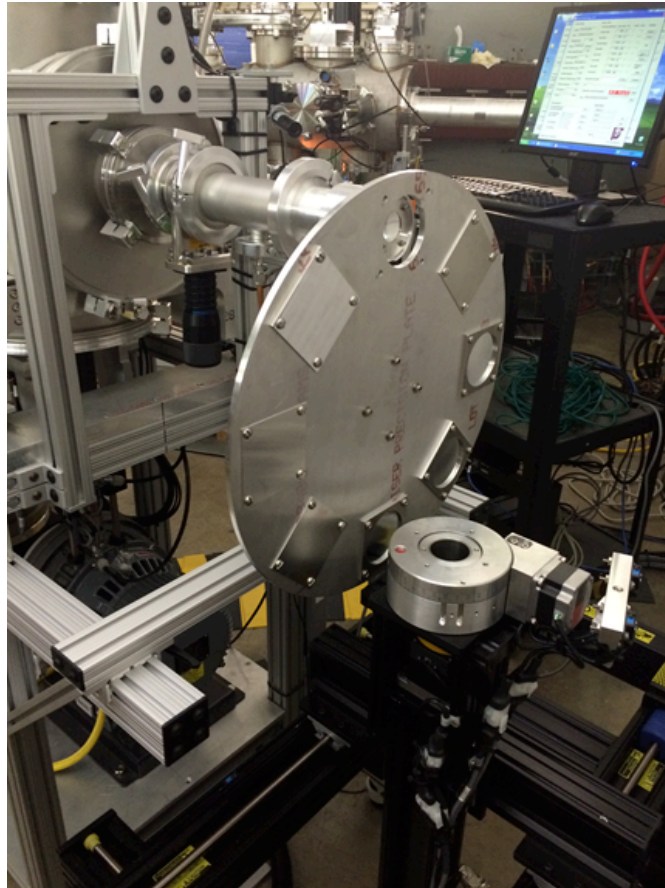


FIG. 1. Rotatable degrader wheel for K150 Radiation Effects Facility beam line.

The degraders, made of aluminum foils and sheets, allow beam energy changes without cyclotron re-tuning. The wheel accommodates up to seven degraders of varying thickness and one opening for an un-degraded beam and is remotely controlled through custom software. Degraders can be swapped out as needed. A standard set of degraders has been developed and tested.

The primary use for the beam line continues to be for space electronics and materials testing with proton beams. Our first external customer use of the beam line occurred in June of 2015. Four additional external customers have conducted proton testing during this reporting period and an increase in external customer use of the beam line in the near future is anticipated.