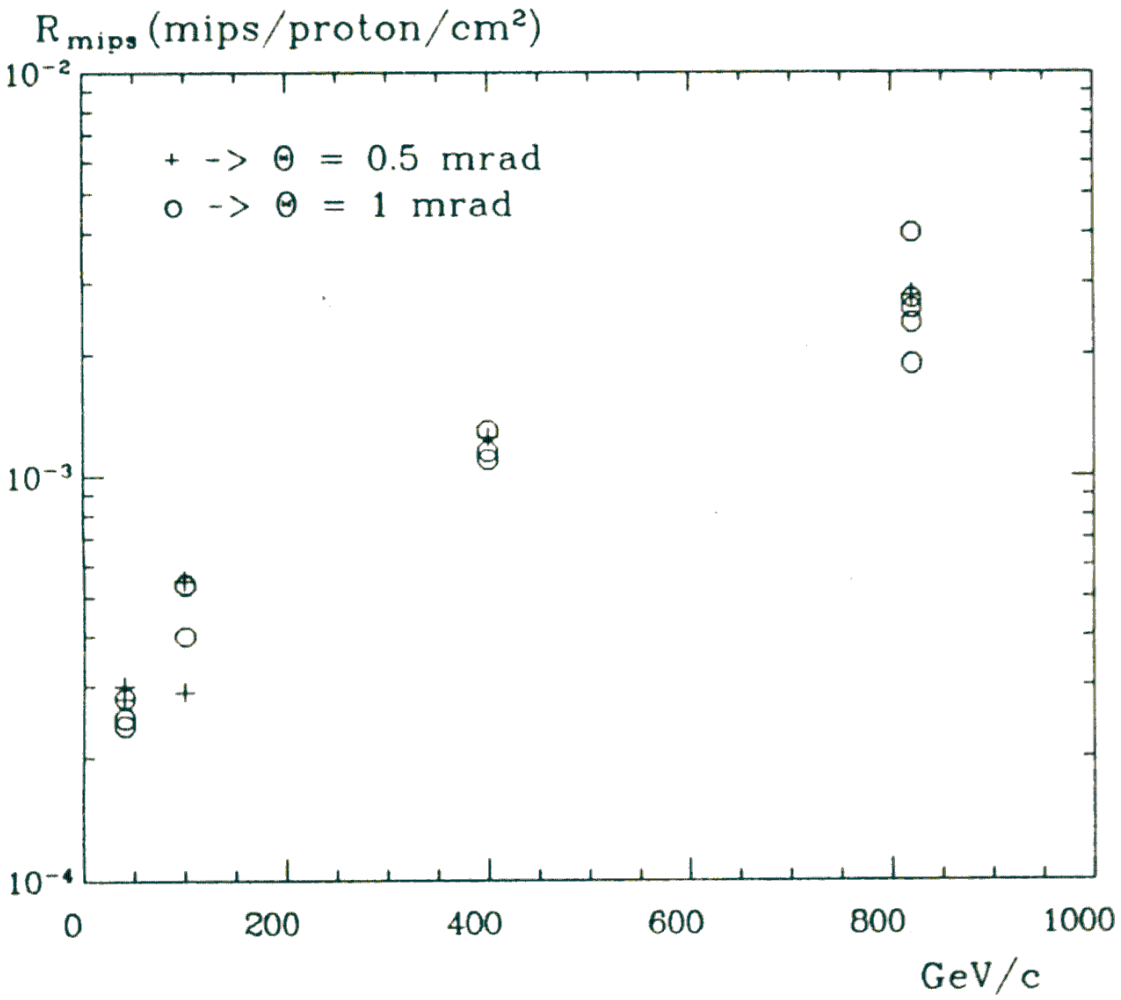

Figure 1: Rate of minimum ionizing shower particles crossing an area of 1 cm^2 at the downstream end of the quadrupole. θ is the angle of the incident proton.

A beam loss monitor is naturally residing in a strong field of radiation which results in radiation damage of the monitor components. The influence of this damage is measured by [5] and [6]. A small reduction in the gain of the amplifier with increasing integrated dose was established. This gain reduction can be compensated by readjusting the threshold of the coincidence. In all probability such a detector should be usable for several years at positions without strong beam losses. To shield the detector against the synchrotron radiation, it is covered with a 3 cm lead shield except for the side facing the magnet.

The Detector

The detector consists of two PIN - photodiodes BPW 34, one on top of the other. The effective area of each diode is F = 0.075 cm^2. They are normally biased with 15 V, so that the thickness of the depletion zone is about 100µm. The signal produced by a diode from the crossing of a minimum ionizing particle is about 10^4 electrons. The accompanying amplifier processes the signal in a time interval less than 100 ns. This interval

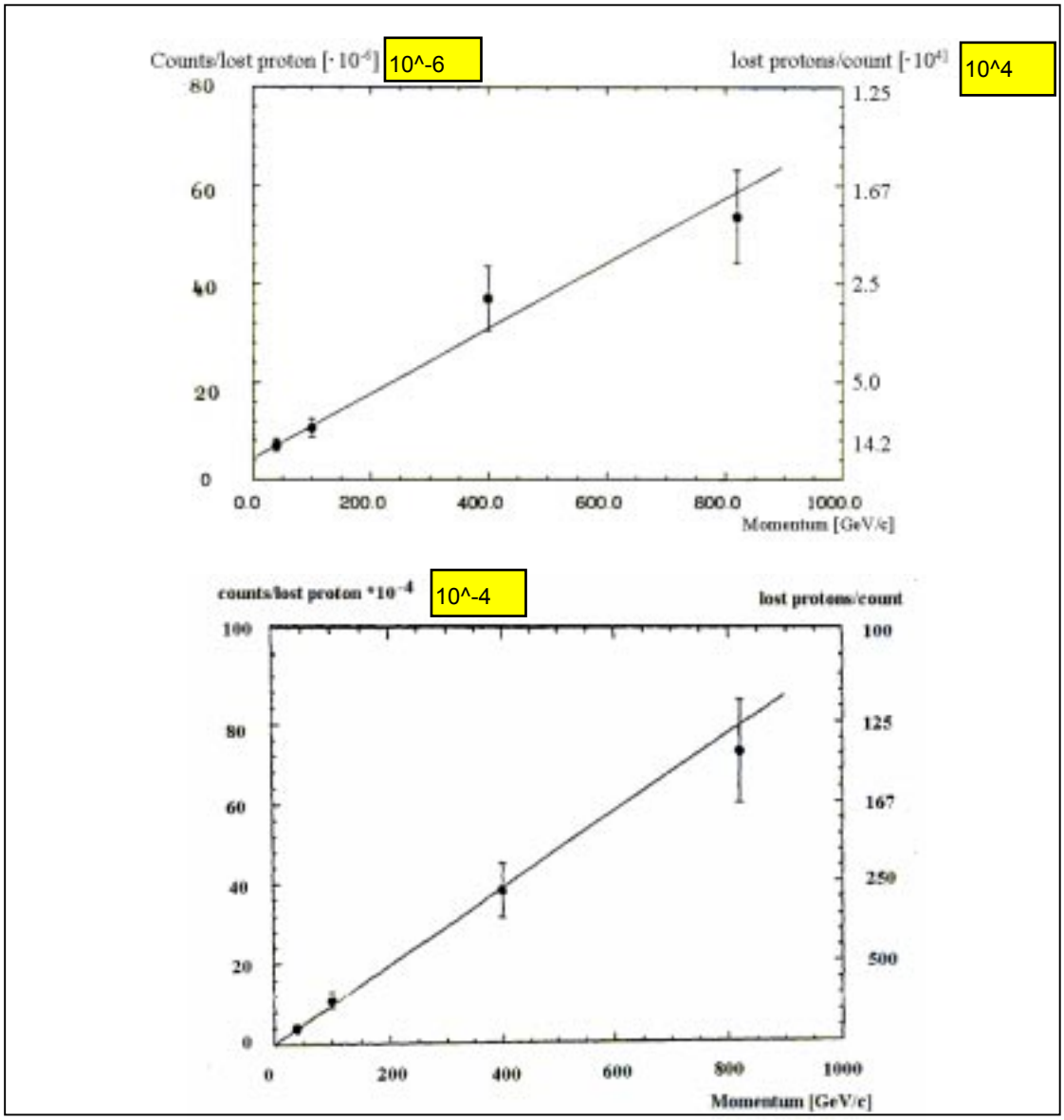

FIGURE 5. a) Calibration of the BLM at the superconducting quadrupole magnets. b) Calibration at the proton collimator. Both cases were calculated for small diodes. The efficiency to MIPs is already included (see above).

However, in both cases the BLM system was not the cause of these events. Due to the simplicity of the counting system there have been no malfunctions of the system during the years of operation. The internal systems check (see above) gives the possibility of an automatic system check using software, which is not yet implemented. But the results of the yearly checks (by 'hand') gave no impetus for such a routine, because only a minimum of investigation was required.

Beam loss induced beam dumps (black lines in Fig. 6): The most frequent events were due to the 'normal' operation of the BLM system. Fig. 7, 8 show typical views of the behavior of the system. Both figures display archived data after a beam loss induced alarm. The upper picture of each figure shows the losses around the entire HERA