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Vertical Beam Blowup During Slow Extraction

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Experimenters L. Ahrens, E. Gill and J.W. Glenn

Reported by J.W. Glenn

Subject VERTICAL BEAM BLOWUP DURING SLOW EXTRACTION

OBSERVATIONS AND CONCLUSION

Vertical beam blowup was measured during flat-top spill for various accelerated intensities, and with and without the rf cavity shorting switches. Beam size is defined as the RMS width of the IPM signal; with a flat background subtraction. The blowup (final size/initial size) is proportional to intensity - $(8 \pm 1)\%$ per 10^{12} accelerated when the rf cavity shorting switches are closed during flat top. The beam size at the start of spill also increases with intensity - $(50 \pm 10) + (3 \pm 0.1)$ mils per 10^{12} accelerated protons. The blowup starts at the beginning of the spill as seen on the IPM at all intensities, and starts ~ 0.5 seconds later as seen in the C39 external beam flag. Opening the switches during flat top reduces the blowup to 15 ± 15% of the switch closed blowup.