# Calibration scans on IPMs

R. Connolly, M. Minty and S. Tepikian

During APEX studies of April 13 and May 11 we checked the position-dependent gains of the IPMs by moving the ion beam across the IPM aperture.

These studies were taken to investigate the indicated emittance change in the two vertical IPMs when the separation bumps at 2:00 o'clock were removed.

It had been proposed that gain depletion of the MCPs at the center of the measurement aperture was the cause of the emittance 'jump'.
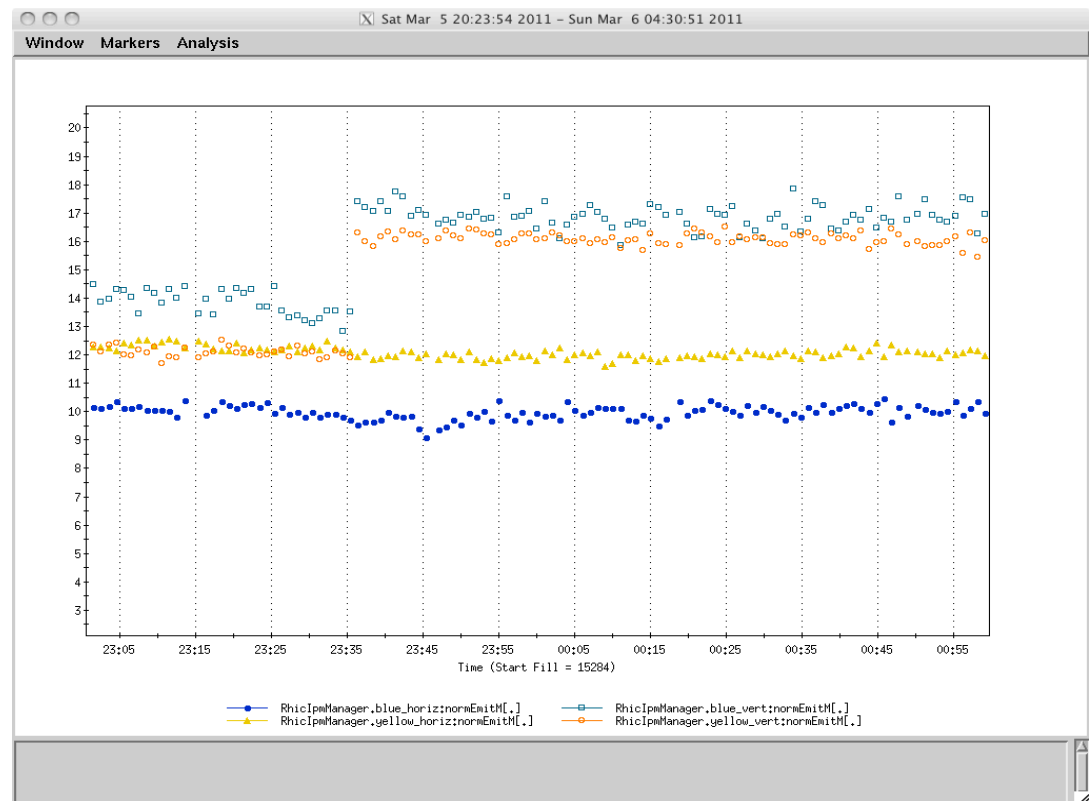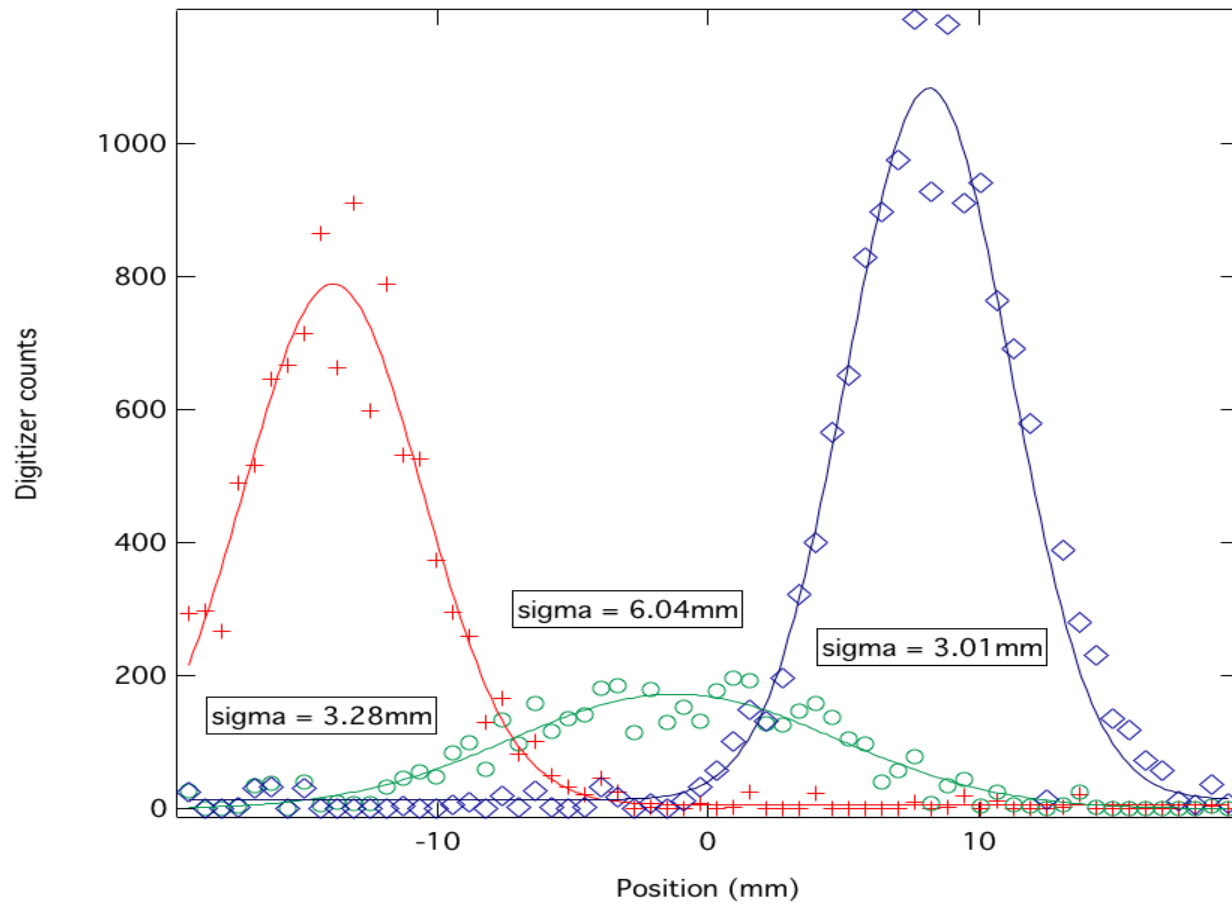
The procedure was to turn off gain feedback and take measurements as the beam was moved across the IPM measurement aperture.

The results show age-dependent gain depletion of the MCPs.
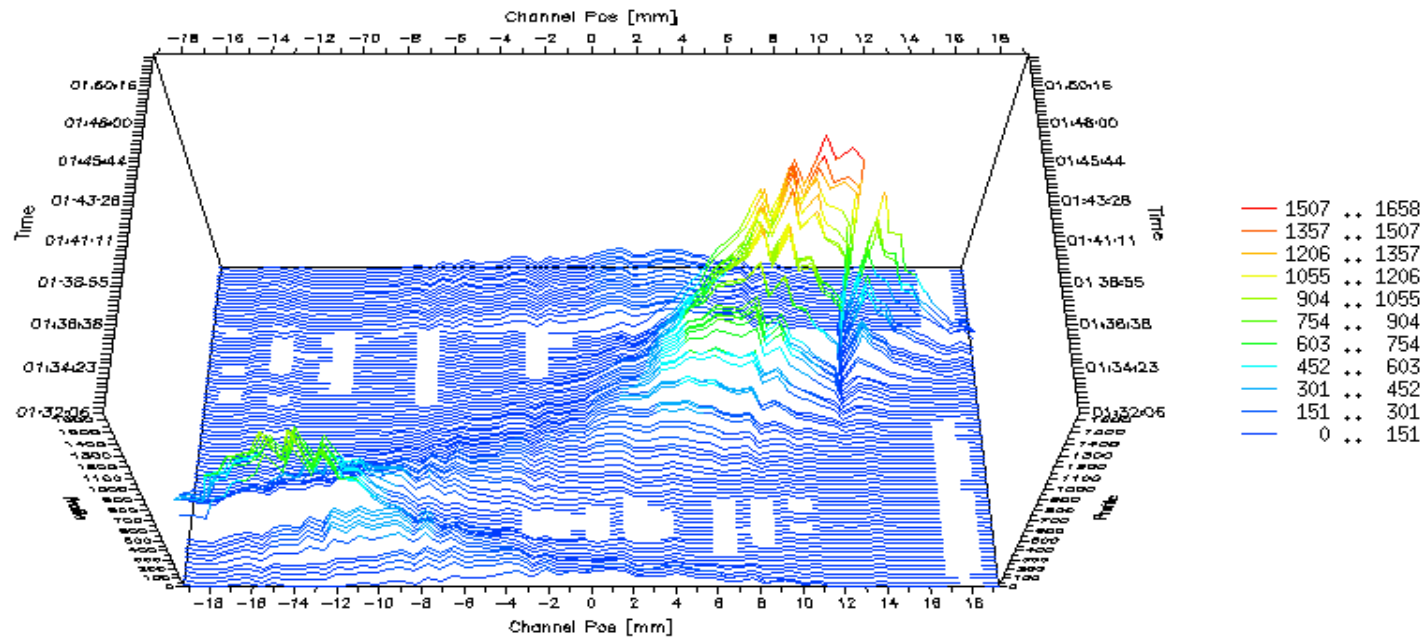
Mountain range plot of Blue Vertical profile scans. The BV detector is the oldest.

Three measured profiles from the BV scan with the rms widths of Gaussian fits.

sigma = 6.04mm

sigma = 3.01mm

sigma = 3.28mm

Digitizer counts

1000

800

600

400

200

0

-10

0

10

Position (mm)

The maximum gain depression in each IPM is found to be approximately linear with age, (12%/year). This is the expected aging behavior of MCPs.

We have generated gain adjustments and dc offsets for the two Yellow IPMs based on the 4/13 data and these are in the IPM application. We are working on a similar set of corrections for the Blue IPMs.
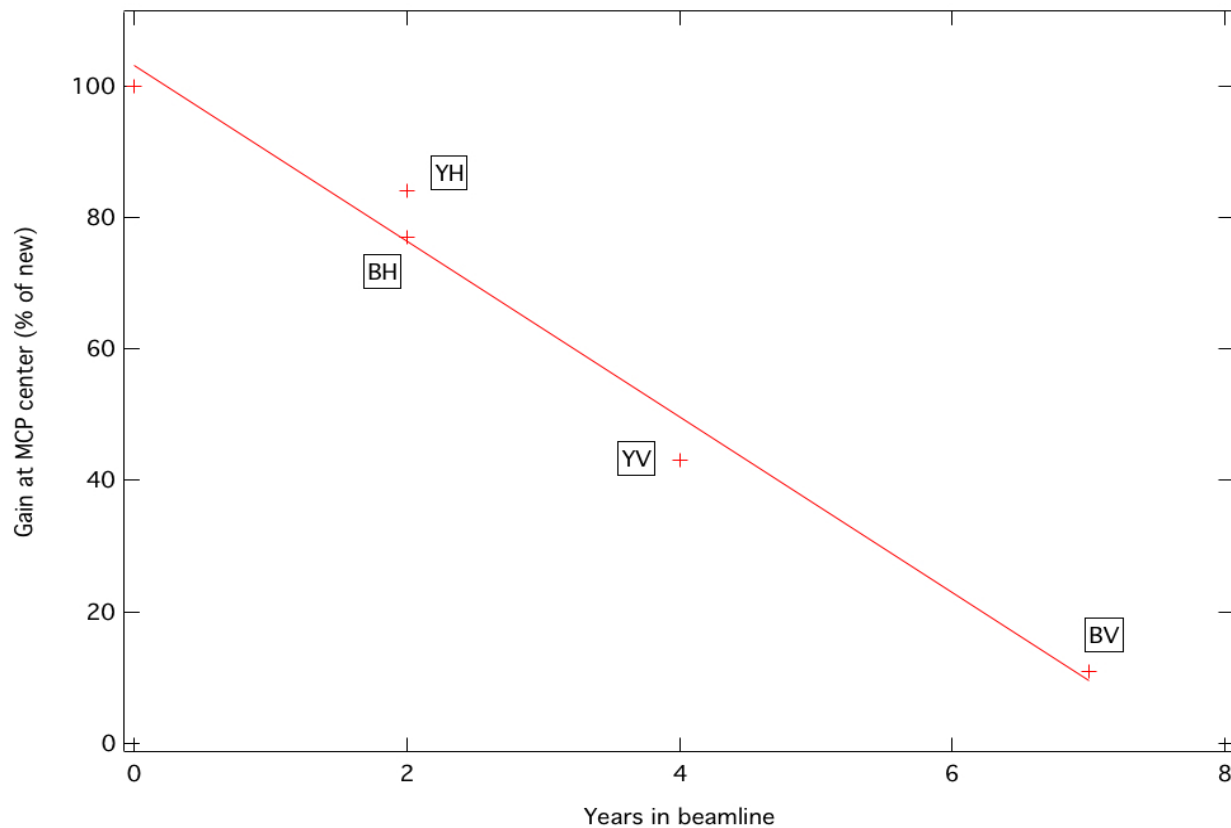
Correction factors applied to Yellow vertical IPM.

Yellow vertical profiles from fill #15284 with separation bump (red) and without bump (blue).

This is the example shown on the first slide.

The top is the **uncorrected** data and indicates a vertical beam size increase of 16% or emittance increase of 35% when bump is removed.

The bottom shows the same data **with** gain and offset corrections. Now the size change is 5%. This is about the scatter in the shot-shot measurements.