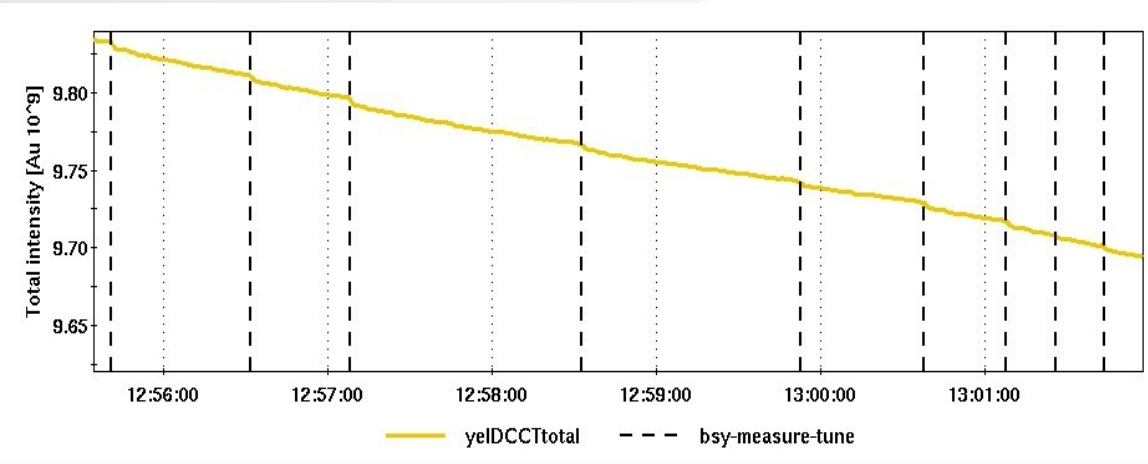
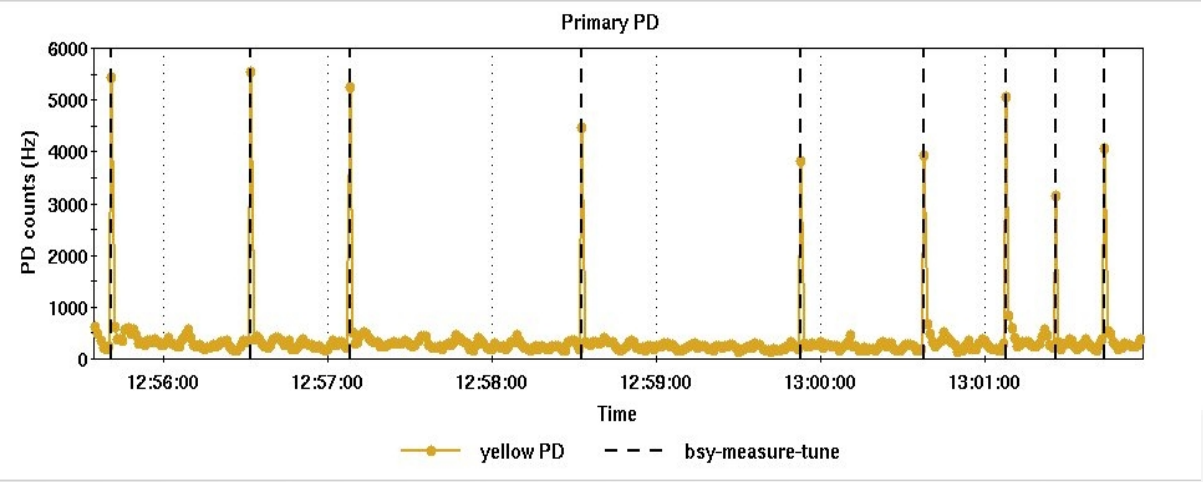
PD rate calibration (20 min! ;))

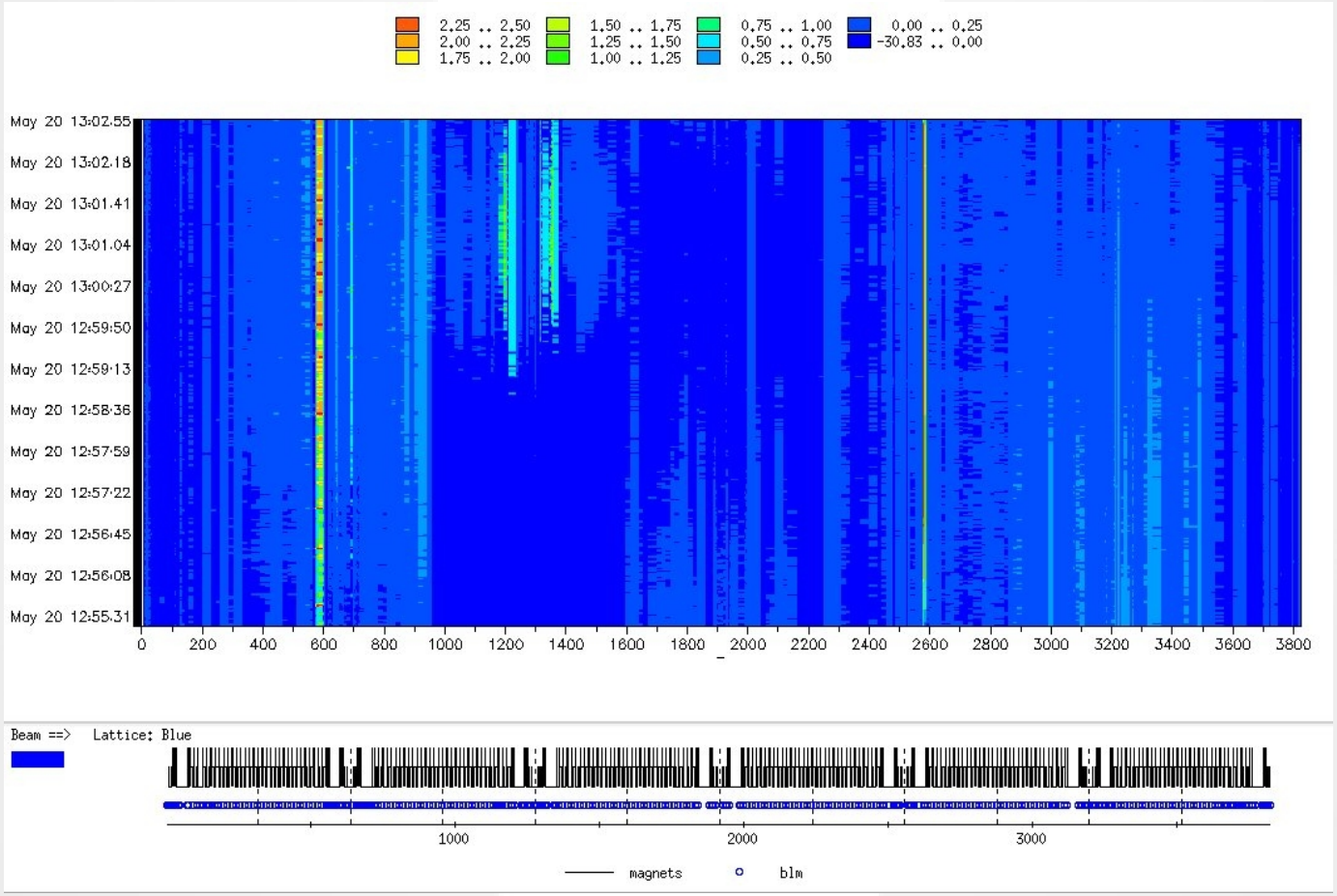
A. Drees, C. Montag, P. Thieberger





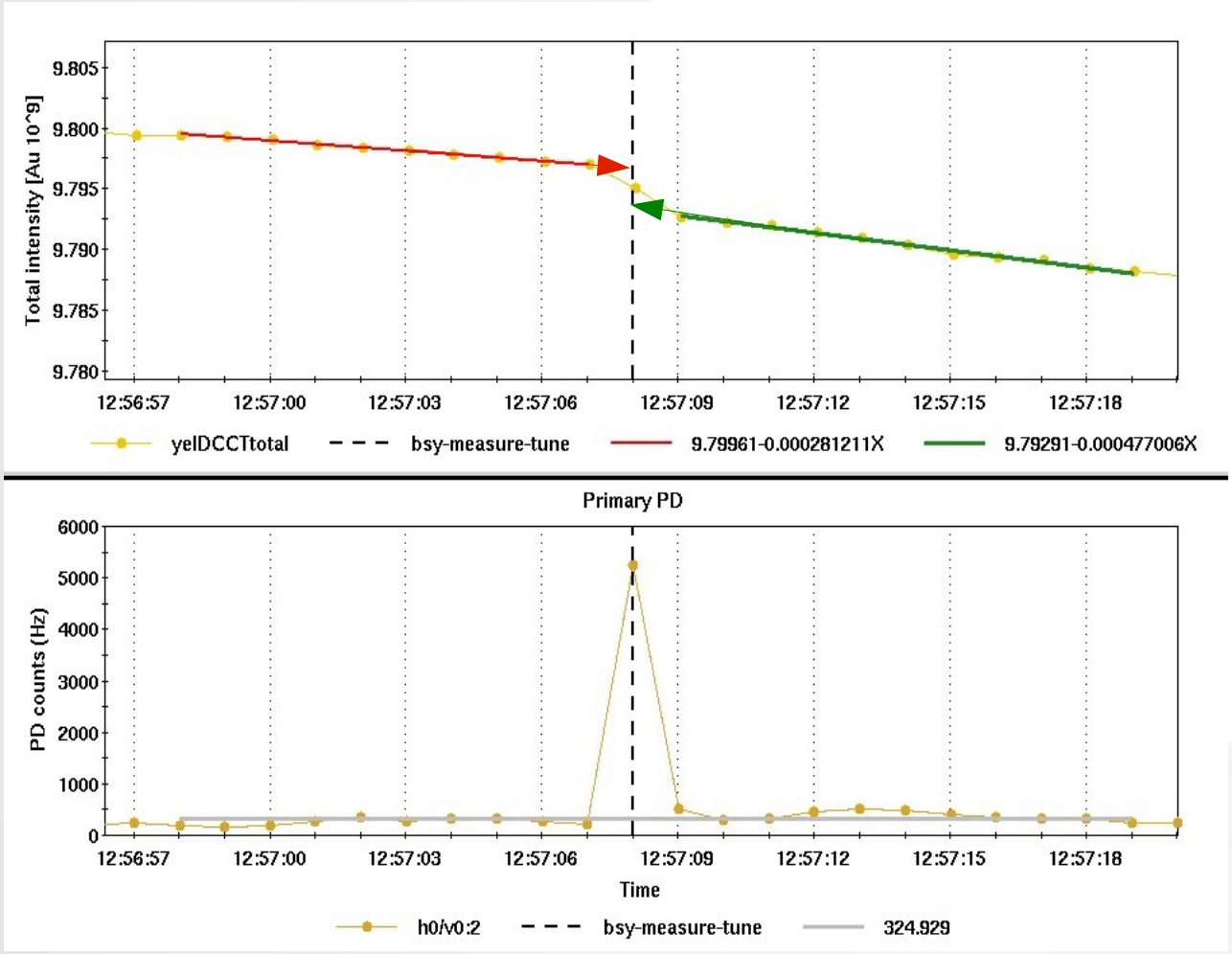
- Au beam with 6 bunches at injection
- Bring collimators in close to force losses in that area
- Excite one bunch at a time with ARTUS (~100 turns kick)
- Measure response signal on collimator Pin Diodes

Loss pattern



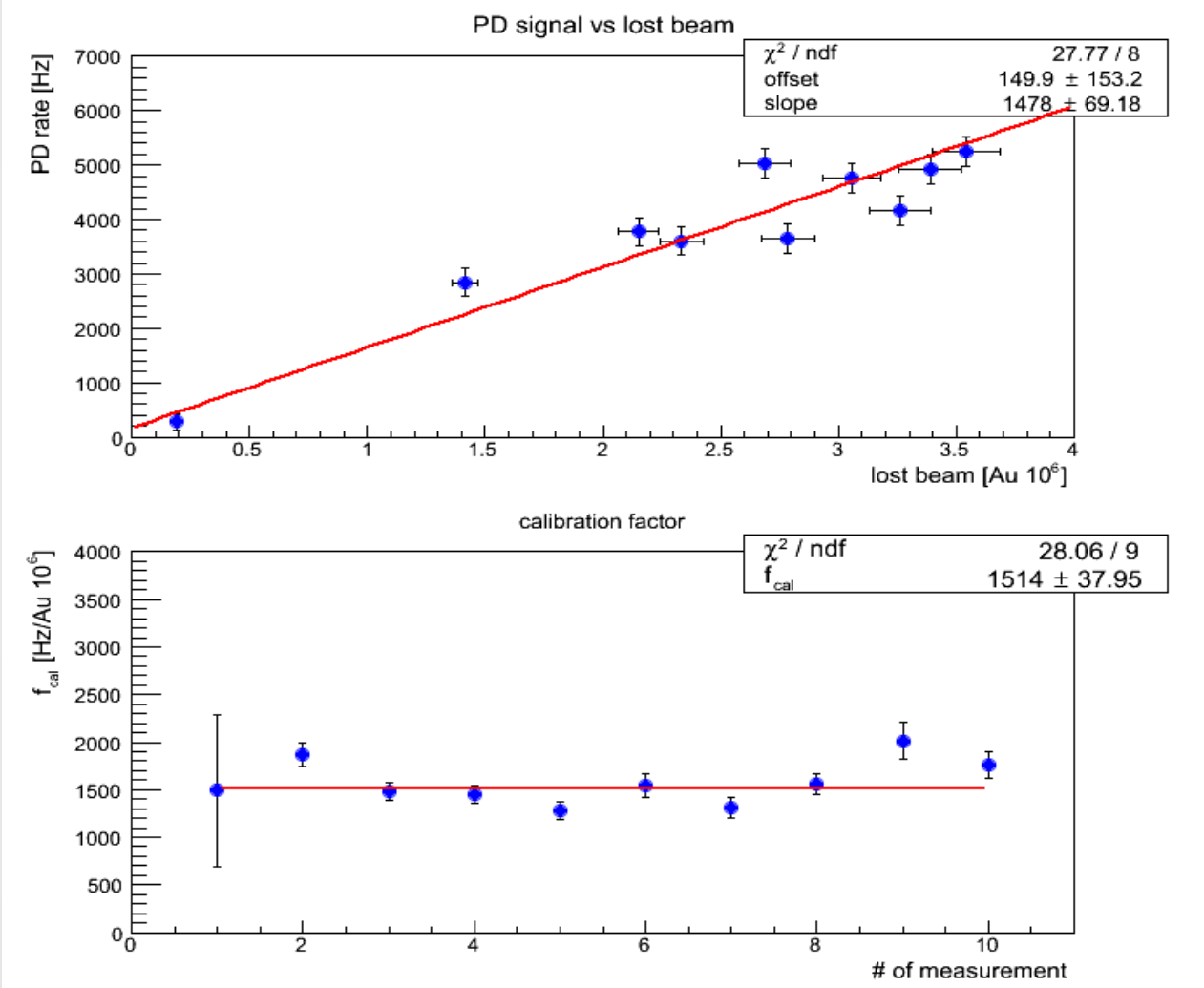
Majority of losses on collimators (but some continuous losses in dump area and at IP2 => likely caused by steadily increasing emittance (amount of beam lost is an upper limit)

Calculate beam loss amount from DCCT data



- Fit slope with 10 data points before trigger
- Fit slope with 10 data points after trigger
- This should account for some of the continuous loss in other areas
- Extrapolate to time of trigger
- Difference at trigger time = amount of beam lost
- Get PD rate, subtract baseline during the 20 sec of measurements

Result



- 10 measurements (first is the continuous loss)
- Result:

f_{cal} = 1500 Hz/10^6 Au ions +/- 170

(or 1 out of 670 lost Au ions @ 10 GeV is detected by the PD)