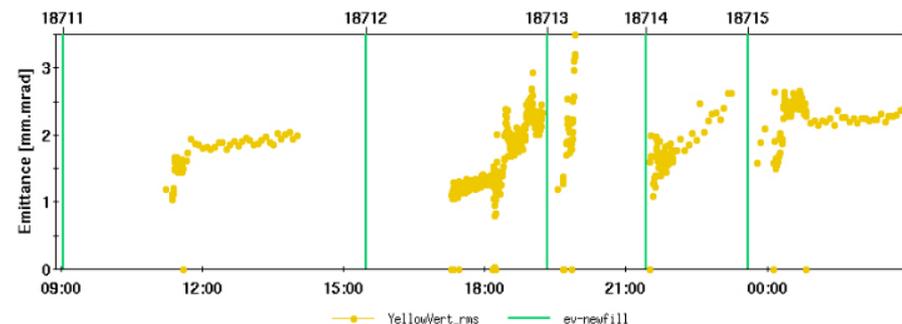
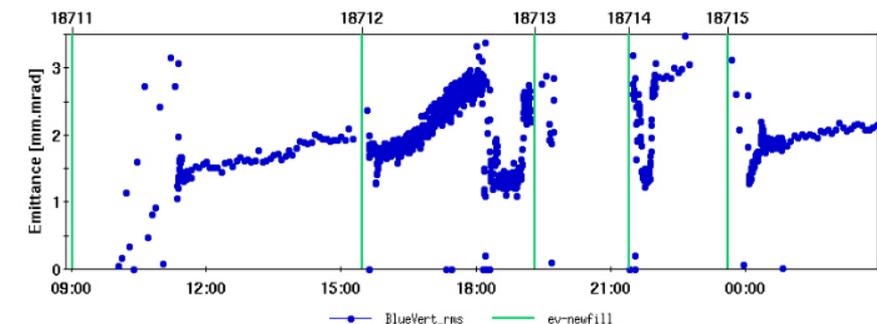
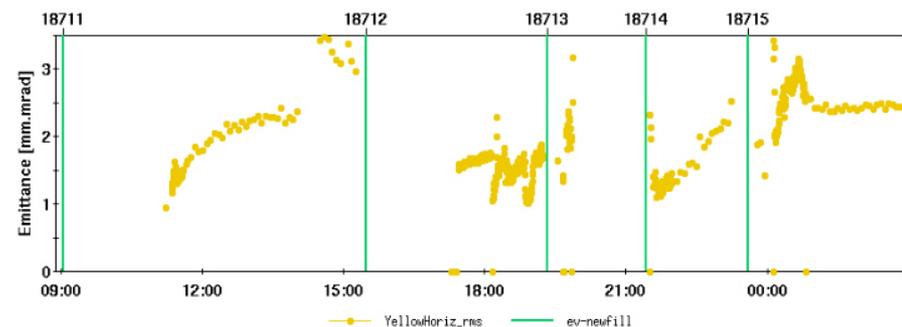
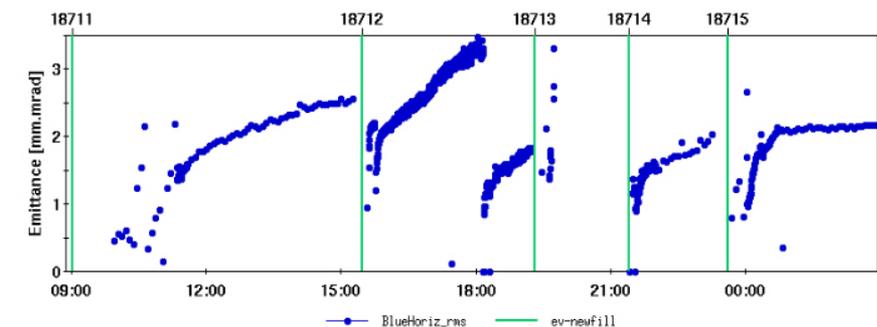
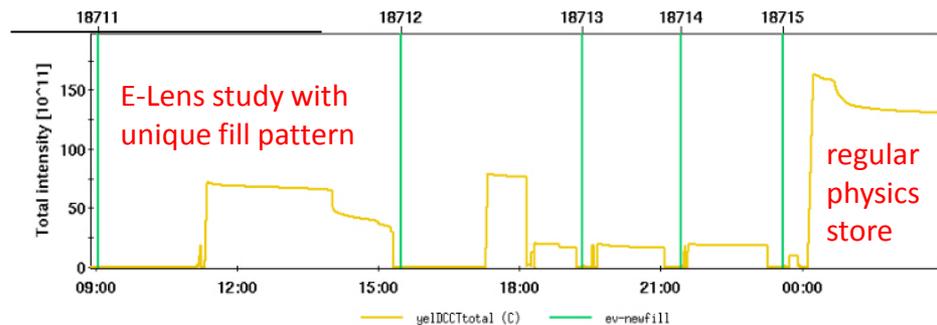
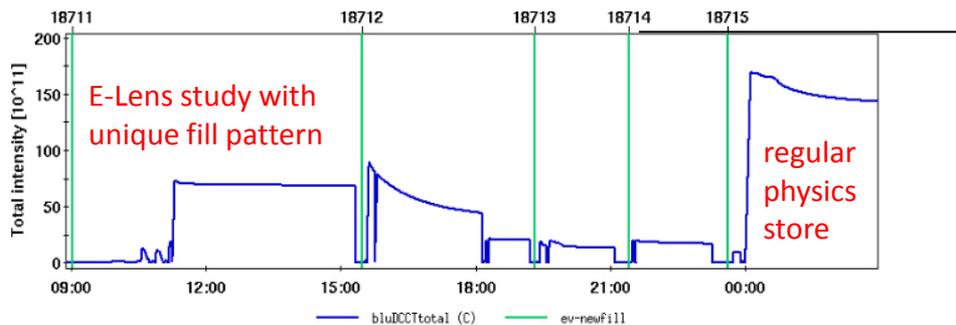
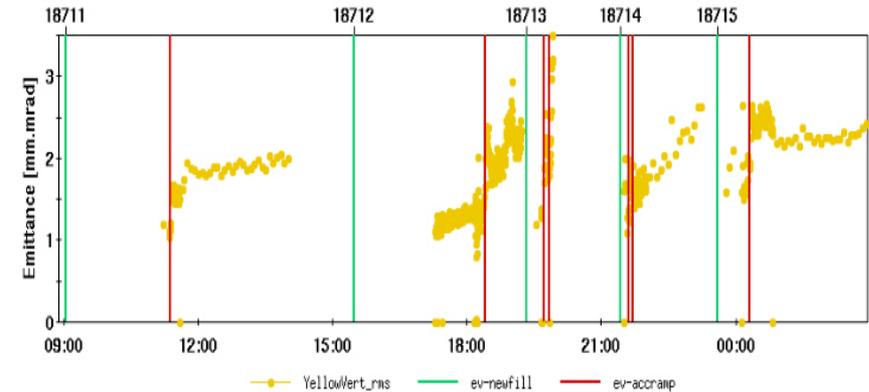
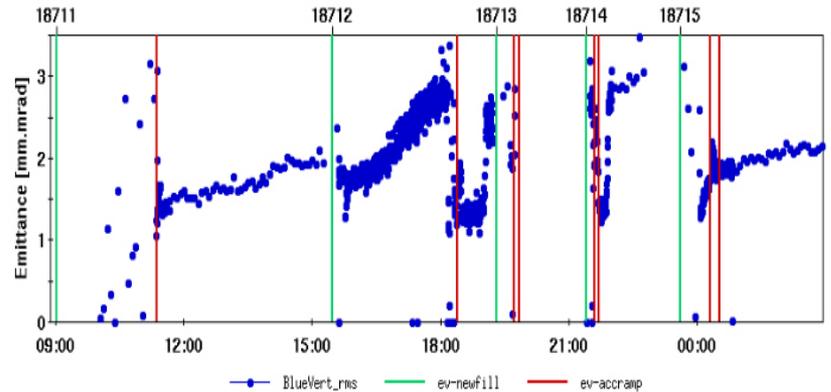
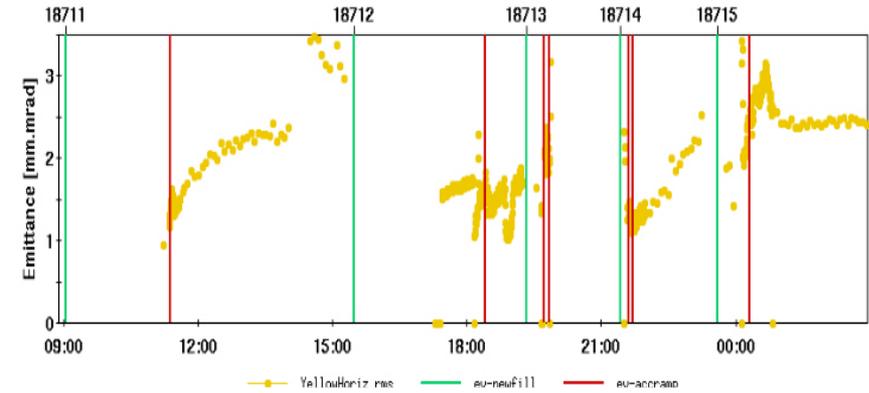
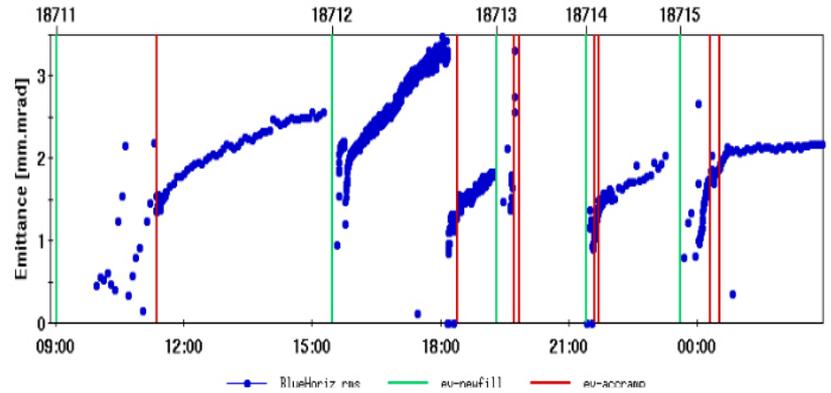
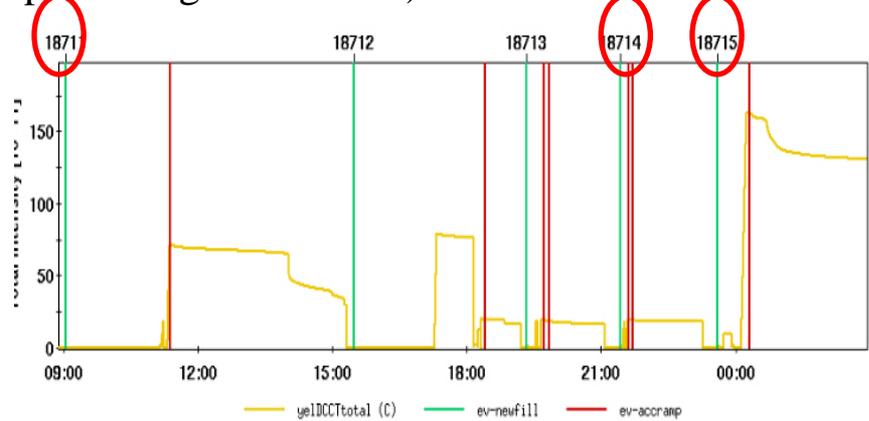
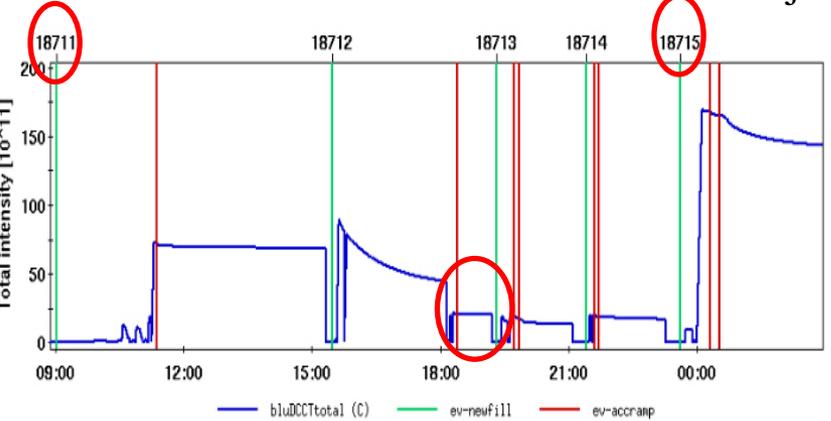


APEX study motivated by observations on 25 Feb, 2015 (M. Minty et al)



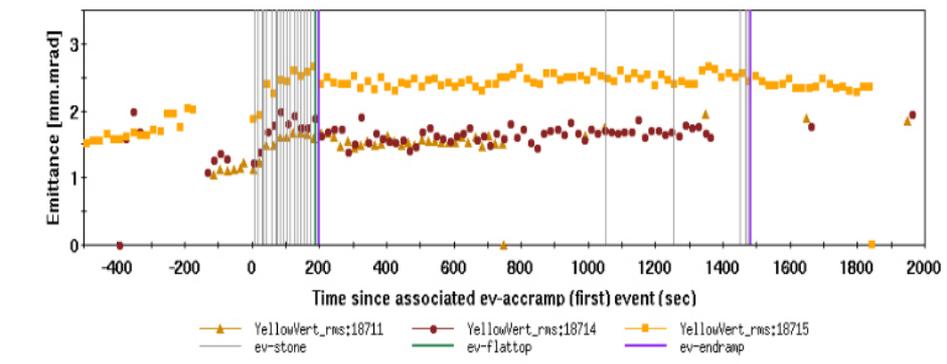
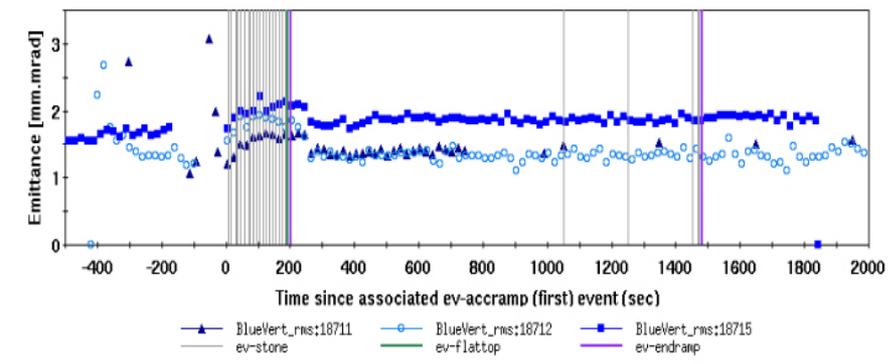
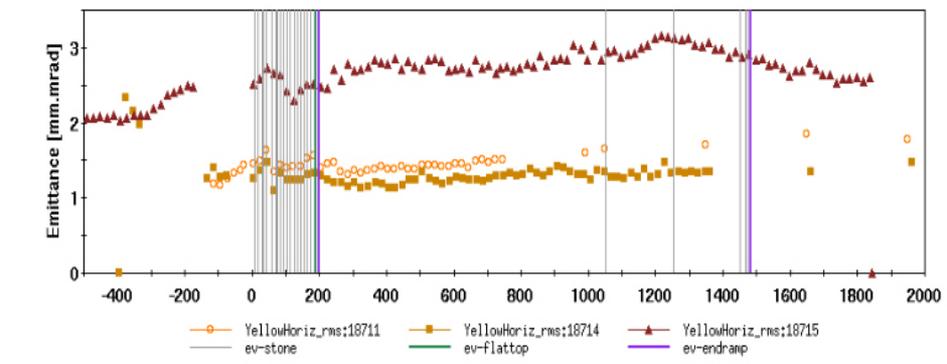
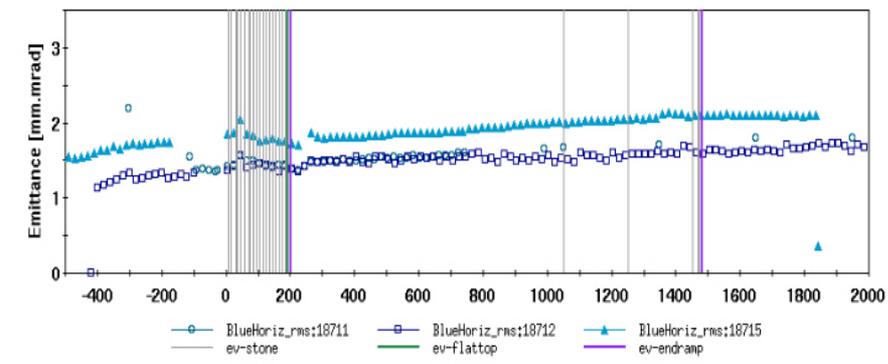
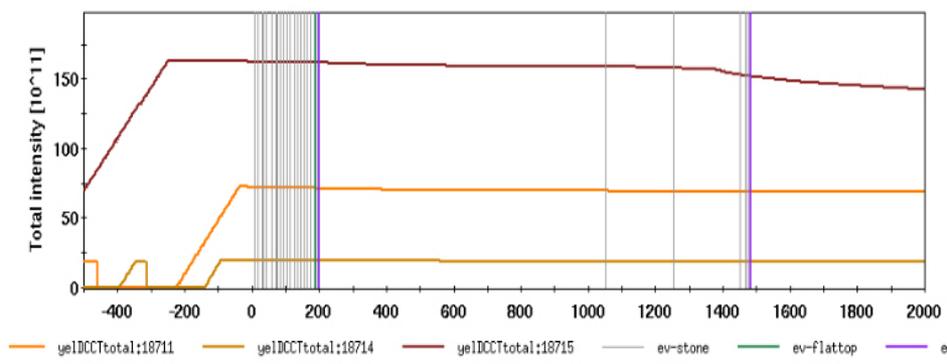
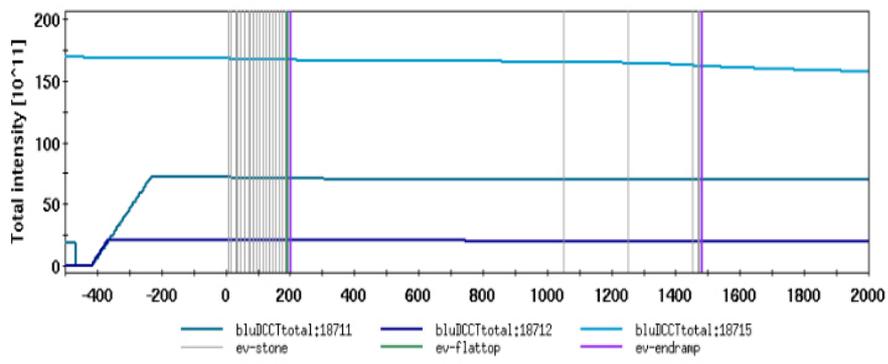
BLUE YELLOW
total I
horizontal emittance
vertical emittance

(Just prior to APEX, started multiple measurements-per-profile acquisitions for RHIC IPMs – so providing better measurements of beam emittances at injection, improves signal-to-noise)



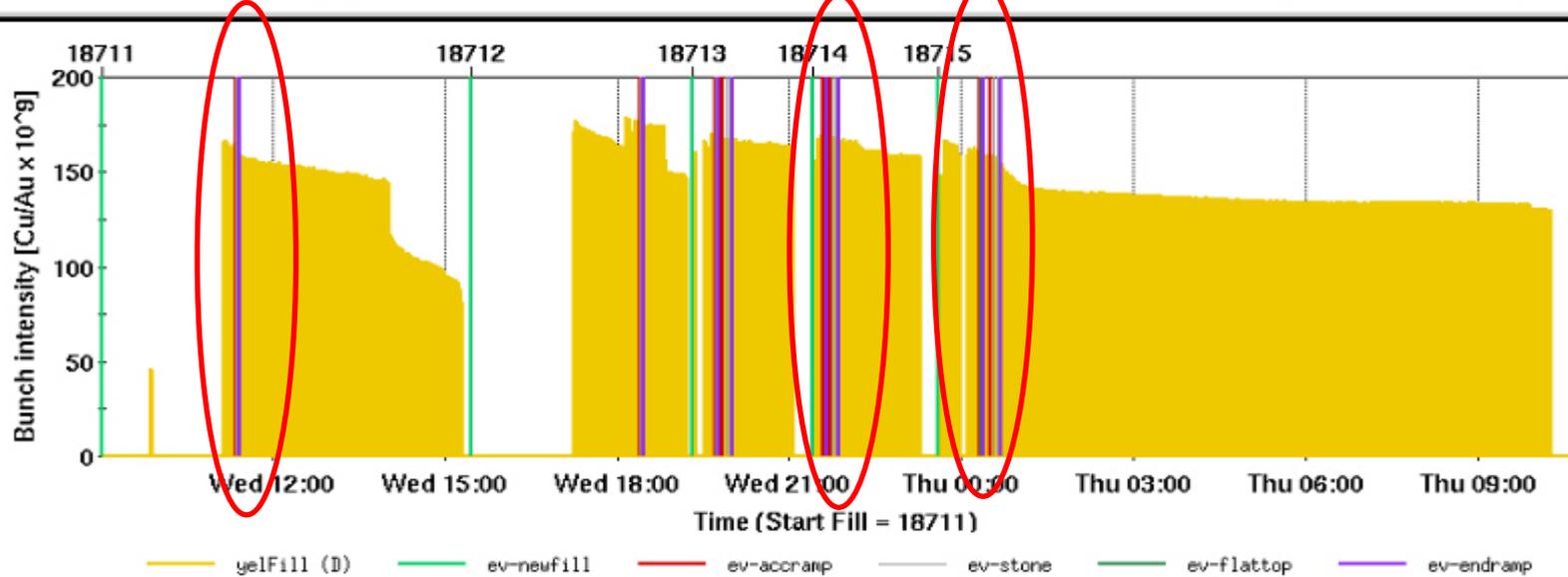
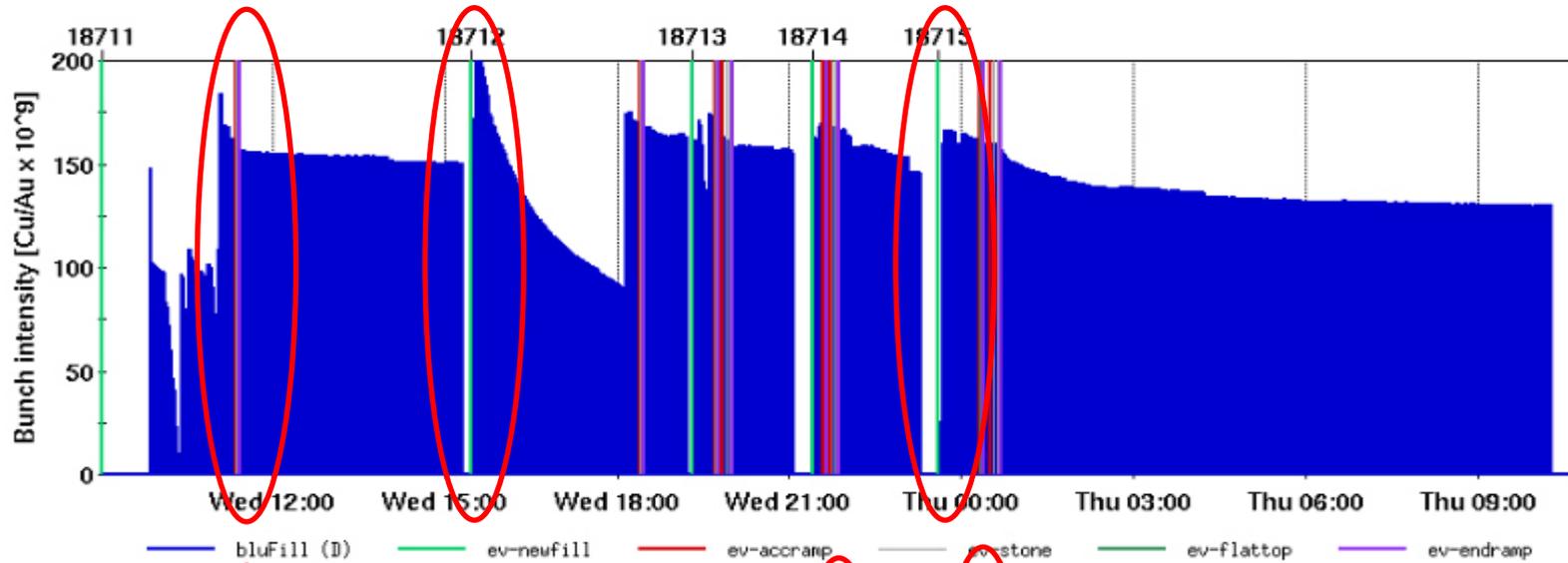
Next: examination of data from highlighted fills

Total beam current (top) and emittances (horizontal/vertical):



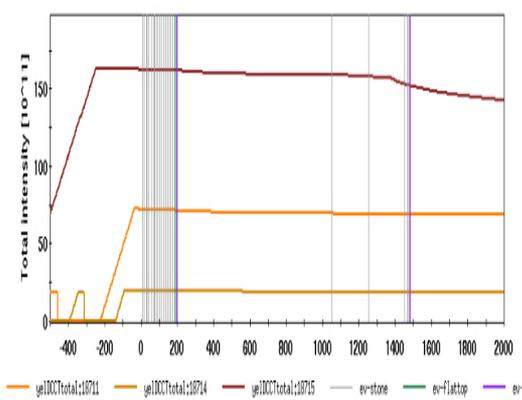
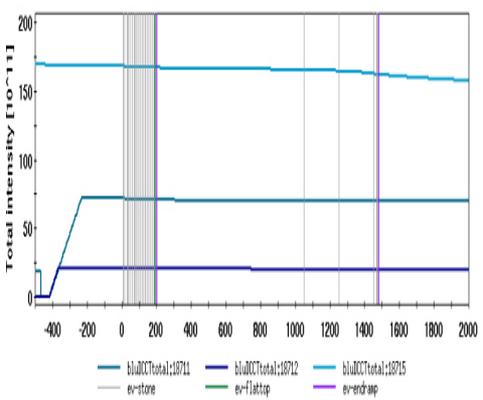
→ Lower total current fills have lower emittances (all 4 planes)

Data from wall-current monitor

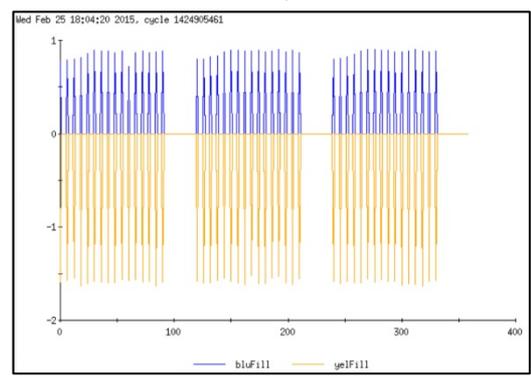


- ➔ Single-bunch intensities same for all 3 cases
- ➔ Evidence for fill-pattern-dependent beam emittances

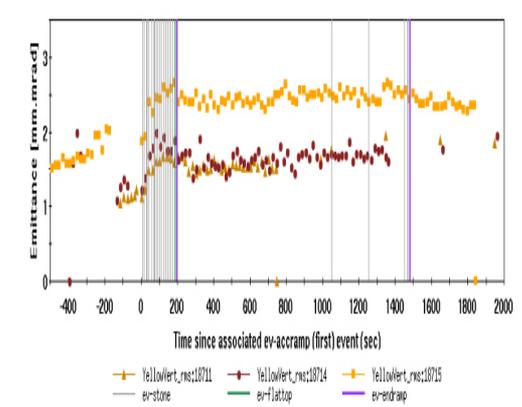
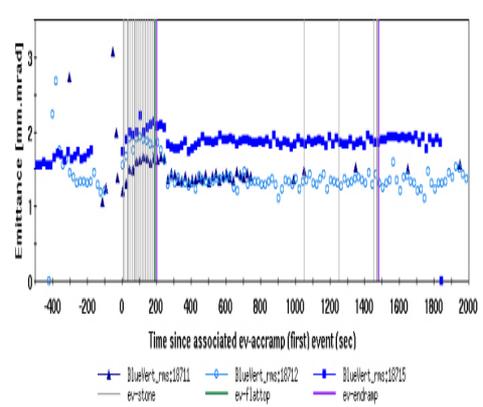
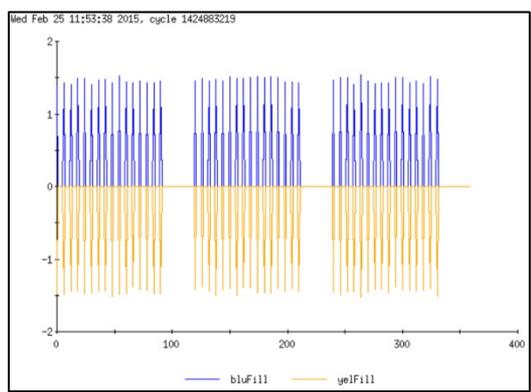
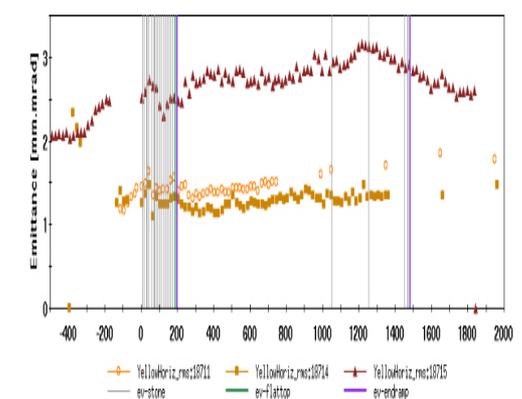
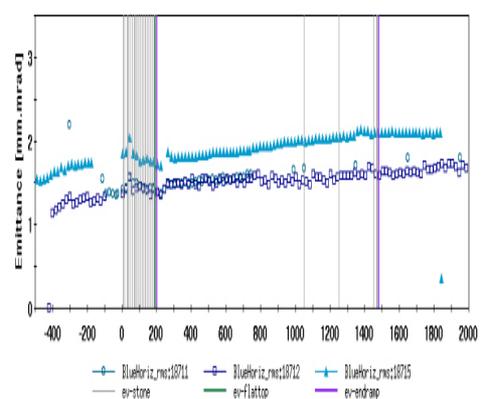
(Again): total beam current (top) and emittances:



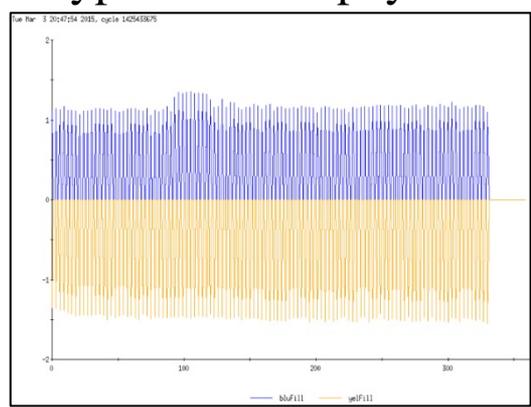
low current, APEX



medium current, APEX

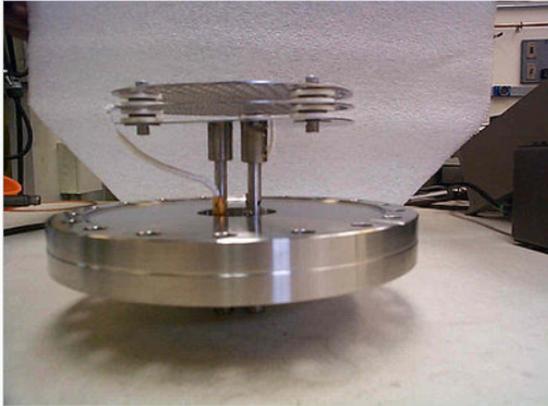


typical fill for physics



Hypothesis: emittance growth is driven by electron clouds

Search for supporting evidence: electron cloud detectors
(with limited geographical coverage: sectors 12A and 2B)



RHIC Style Electron Detector on the bench. The top screen is a grounded image current shield, the middle similar material screen is a repeller, the bottom plane is the collector. The collector is biased, and the signal is ac coupled out via a capacitor. These are modeled after the ED's used at the PSR-Lanse



➔ Signal response coincident with rebucketing
(higher peak bunch intensity)