

Beam-beam MDs 2nd MD slot

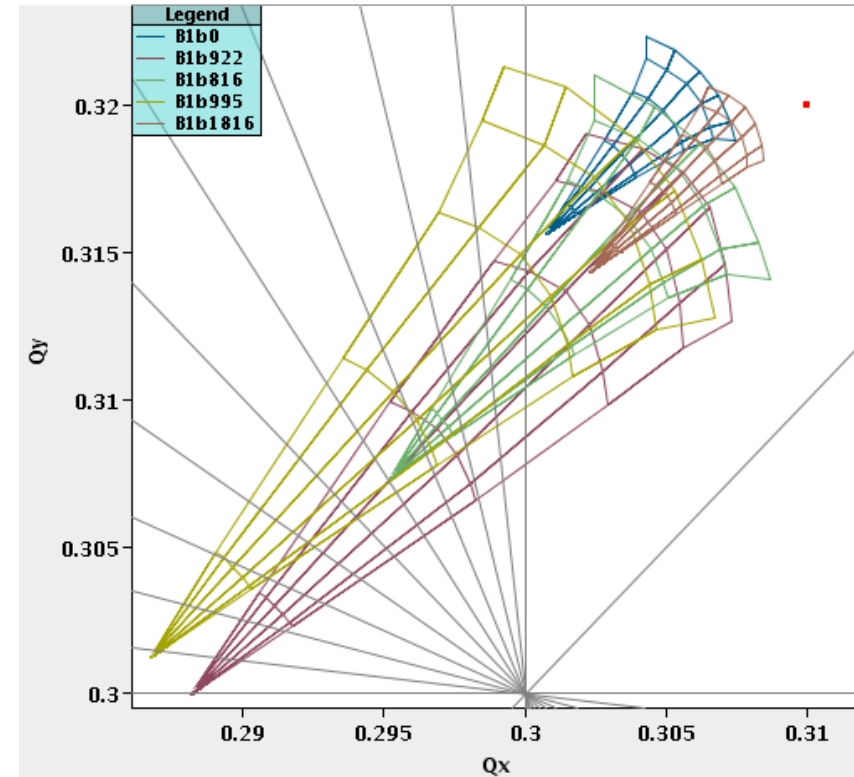
T. Pieloni for the Beam-Beam WG

- End of Fill Tune Scan
- BB limits, long-range, effect of intensity
50 ns spacing and high intensities
- Leveling with β^* with constant crossing angle
at 1 IP at constant crossing angle (alternative to offset) MD request by Squeeze Team

- Beam-beam limit head-on for unequal beam sizes
different emittances and/or β^*
- Emittance growth with noise and beam-beam
- Transverse noise and coherent beam-beam
- Collisions with alternative working point (half-integer)
- Beam-beam Limits, long-range, effect of separation
- Long-range beam-beam effects with pseudo flat beams ($\beta_x \neq \beta_y$)
- HV compensation

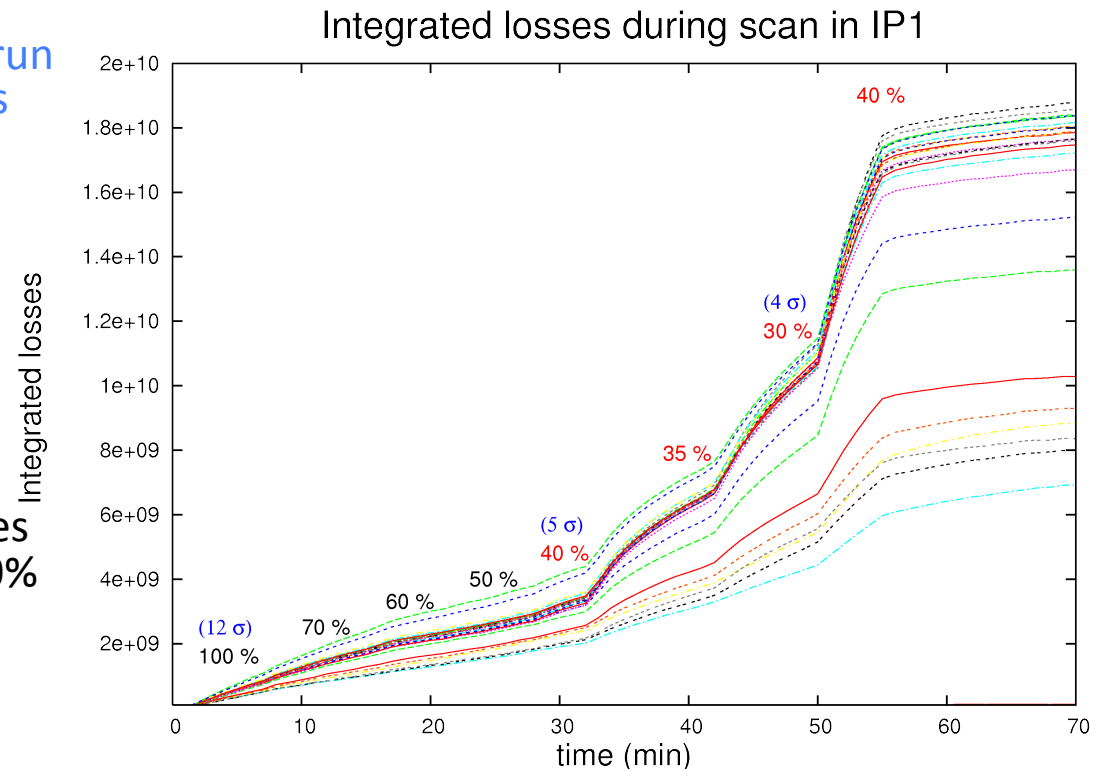
Tune Scan of colliding beams

- End of fill study: full beams (1380 bunches per beam)
- 4 STEPS (2 beams 2 plans):
 - Go down in tune along the diagonal
 - Back up as soon as visible effects on lifetime
 - Move perpendicular to diagonal to see LR effects then step back as soon as visible effects on lifetime
 - Moving up along the diagonal
 - Clean Tune measurement (reduced damper gain?)
- Move in steps of 0.001 and stay steady for **minimum 5 minutes** (finer choice based on last week scan analysis)
 - **Need Machine Tune** and **Observe lifetimes**
 - Bunch by bunch luminosity from the experiments
 - Measure single bunch emittances (fast BSRT scan over reduced number of bunches)
 - Single bunch Tunes from Schottkys if possible



Beam-beam Limits: LR high intensities

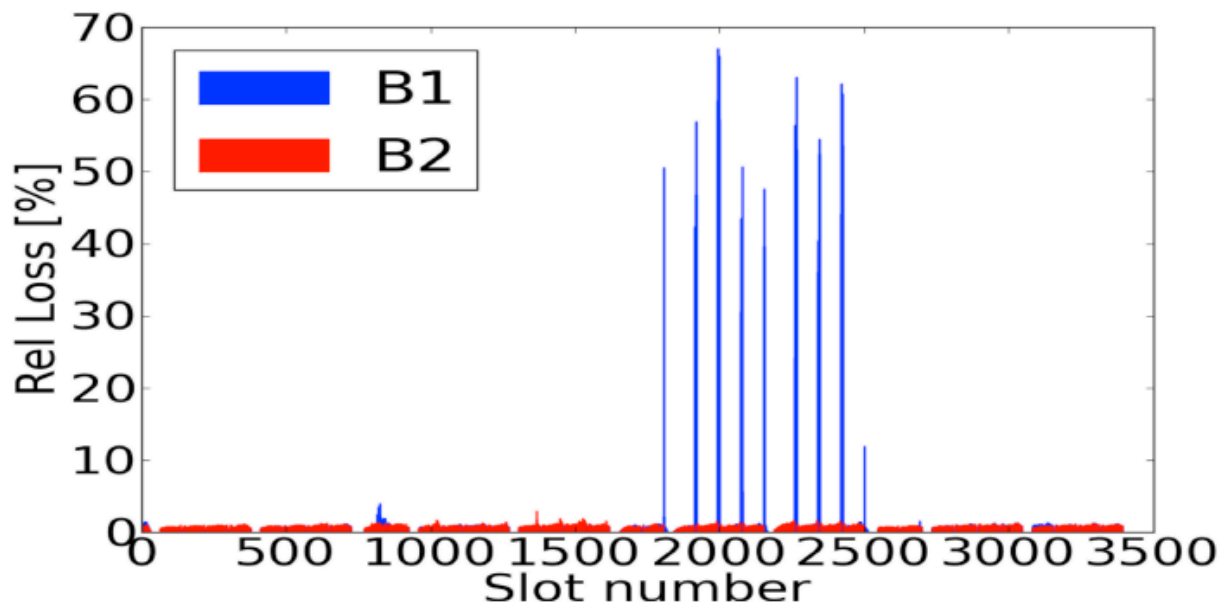
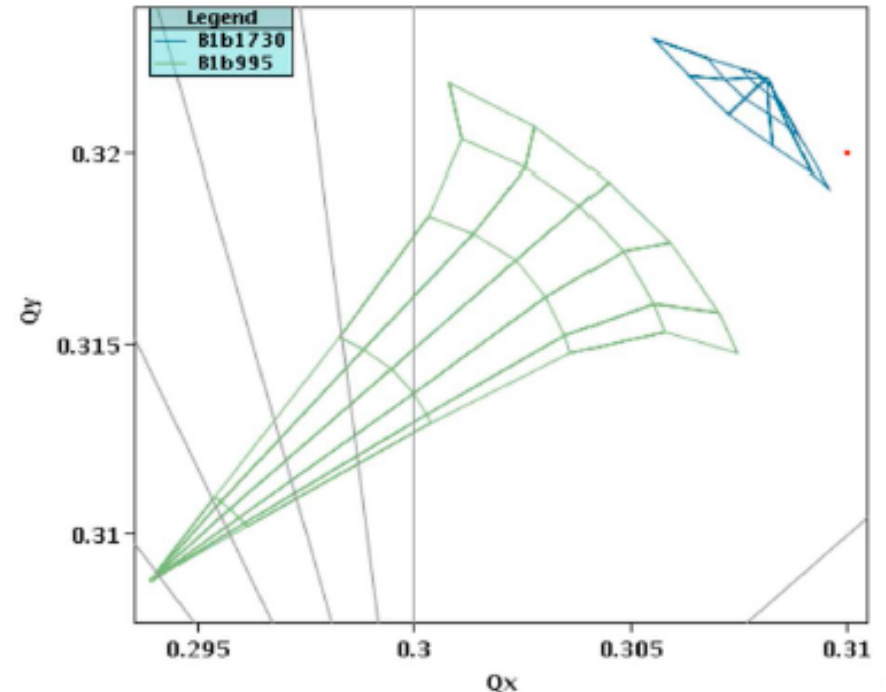
- Find possible long-range limits:
 - 50 ns beams with full complement of long-ranges in IP1 and IP5
 - High intensities as proposed for 2012 run $1.7 \cdot 10^{11}$ per bunch emittances small as possible
- Only at top energy, fully squeezed
- Define criteria for separation by reducing crossing angle
- Need: crossing angle and collimator changes 36 bunches per train. Reduce in steps of 10% beginning then 5%
- Observations:
 - beam lifetime and losses for different crossing angles
 - emittances as function of crossing
 - Atlas vertex detector if possible



Leveling with β^* at constant crossing angles

- MD Request from Squeeze Team
- **BB MOTIVATION: Alternative to leveling with offsets at different IPs**

Recent observation of instabilities shows lack of Landau damping on private IP8 bunches (colliding with sep 2σ). Filling schemes to avoid this configuration but experiments want to level the luminosity (IP1, IP8 and IP5) then we **need alternative**.



Leveling with β^* at constant crossing angles

- From beam-beam we need full LR encounters (1 train of 36 bunches) to test the full process with constant crossing angle to ensure
- The β^* should allow a factor 2-4 to provide the needed leveling in lumi requested from the experiments (IP1&5 3 m \rightarrow 0.6 m for IP8 10 m \rightarrow 3 m)
- Observations:
 - beam lifetime and losses for different β