

SPS status

H. Bartosik for SPS operations team

MSWG, 27.10.2017

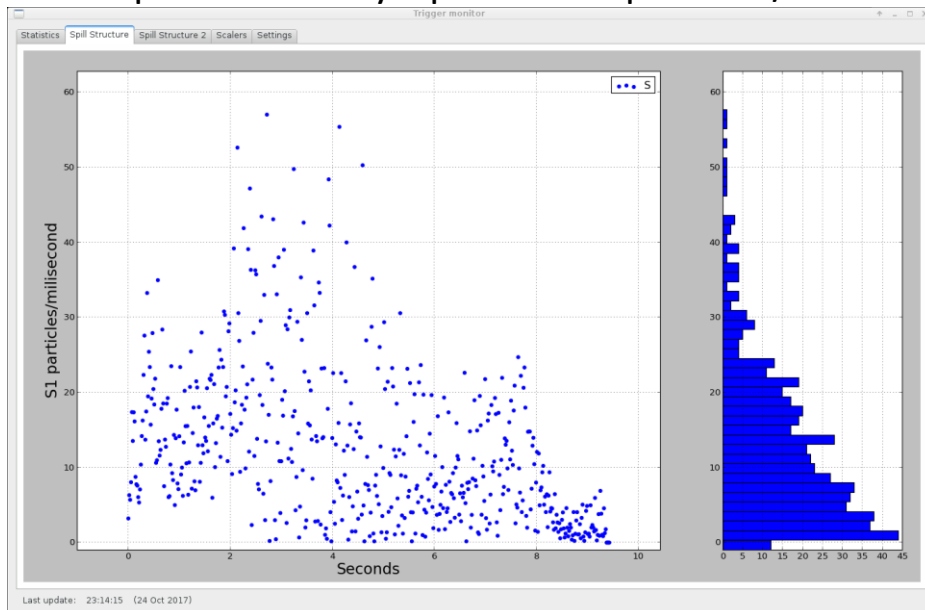
SPS overview

- Fixed target beam – since Monday with Xe
 - Will have 6 extraction energies
 - Now at 358 ZGev/c (the highest of the 6)
 - Ongoing work on improving spill (see next slides)
- LHC beams
 - Operation with 8b4e BCS – OK, no particular complaints from LHC
 - Last night sent the 2x4 van der Meer indivs for 150 bunch run – emittance at LHC injection unfortunately not measured with wire scanners (need to look at BSRT data in Timber), but beam characteristics at SPS flat top very close to specs
- MD highlights
 - Lifetime studies of partially stripped Xe
 - Horizontal aperture studies
 - Q22 vs Q20 studies with LHC beams
 - High intensity MTE tests
 - Characterization of a3 in preparation of crab cavity tests

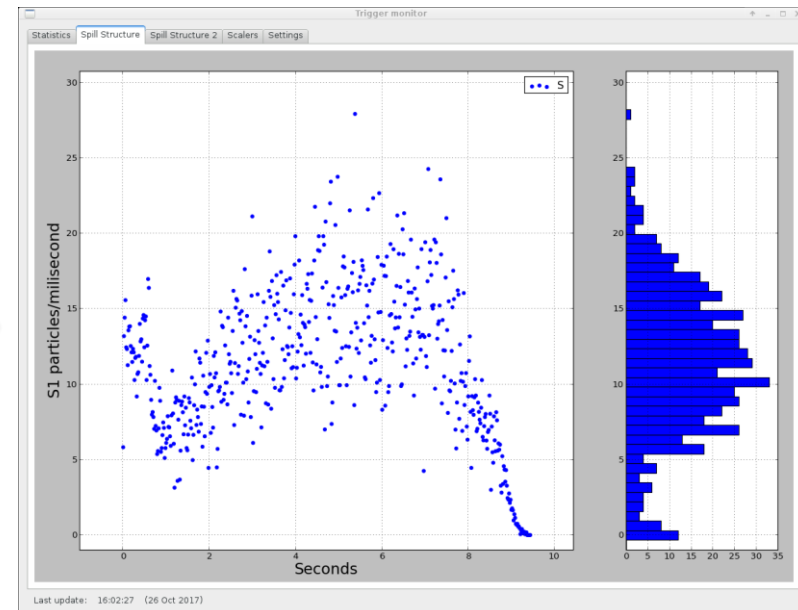
Improvements on spill with Xe beam

- Experiments suffer from spill affected by quadrupole ripple
- Direct compensation of 50 Hz not possible with ions (no instrumentation)
- Maximized chromaticity to reduce effect of QF ripple on spill
 - Larger chromatic tune spread
 - Larger range of Qx sweep is required for the extraction → less sensitivity to QF ripple

Spill on Monday: spikes of 60 particles/ms

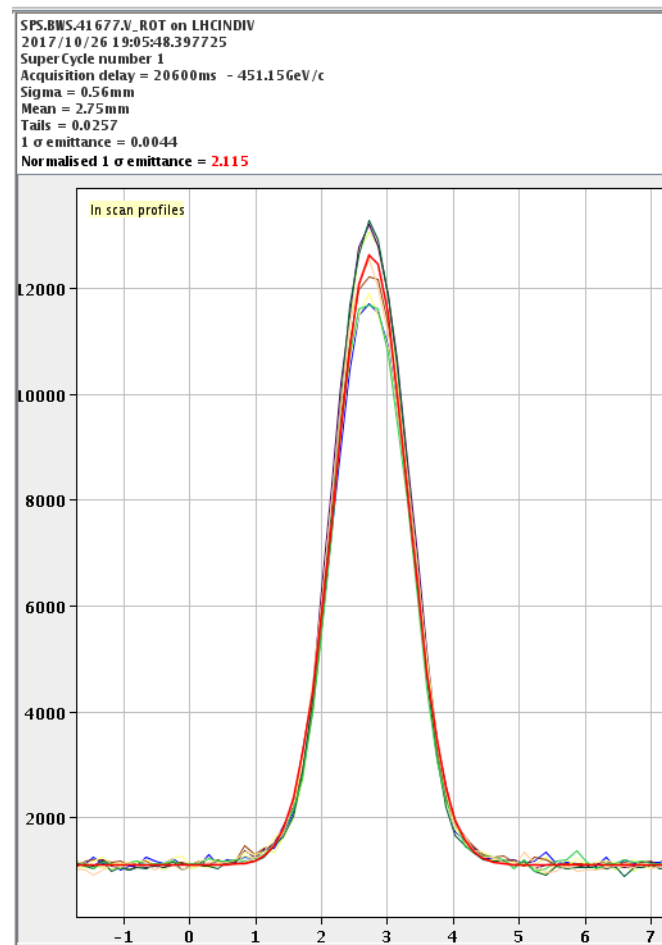
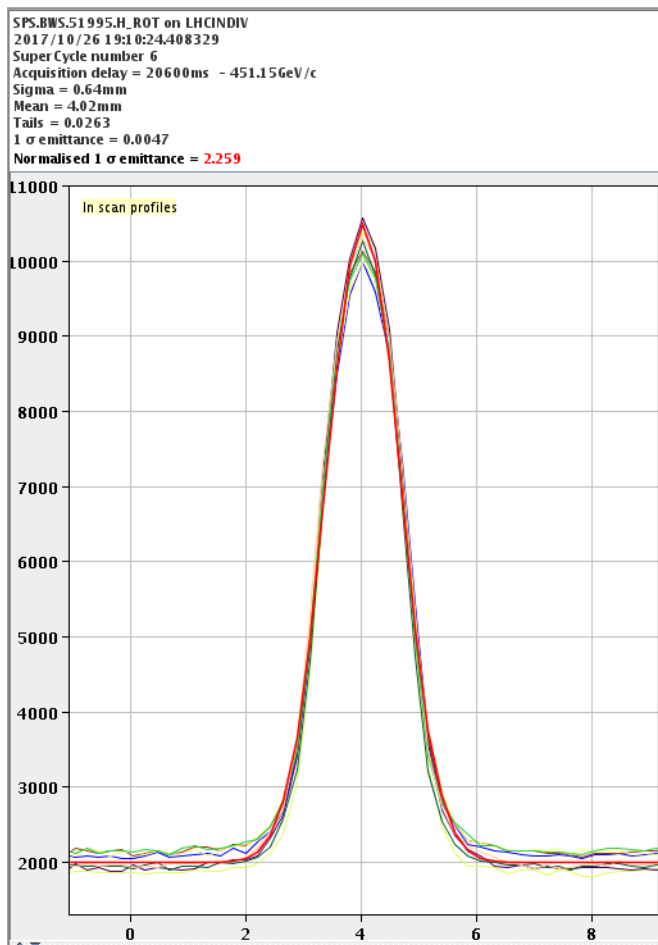


nice distribution around 15 particles/ms



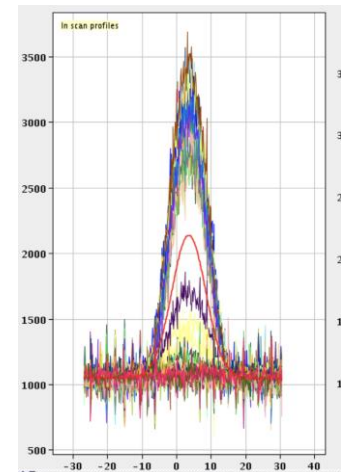
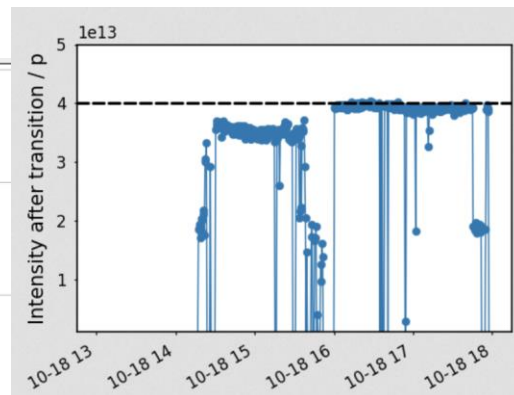
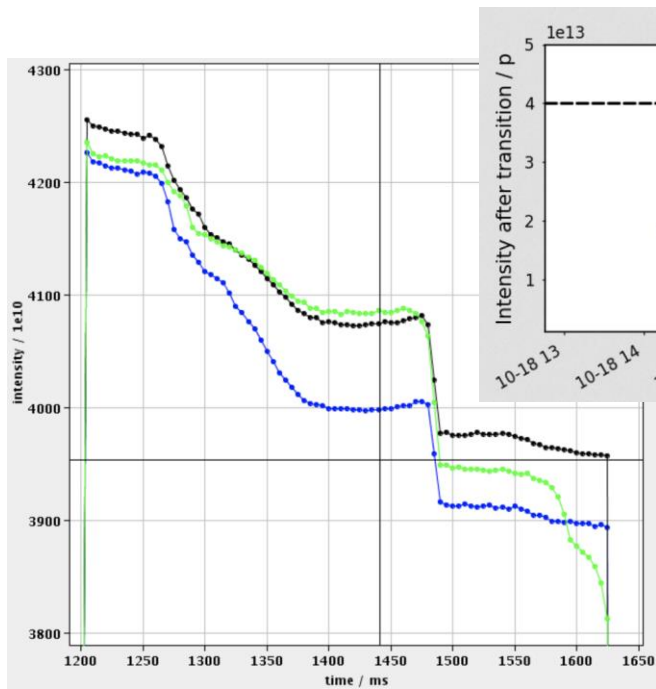
Van der Meer beam in SPS

- Yesterday vdM 4 bunch beam was sent to LHC (for 150 bunch fill)
- Emittance measurements in SPS very close to vdM specification – thanks to optimizations done in the PSB!

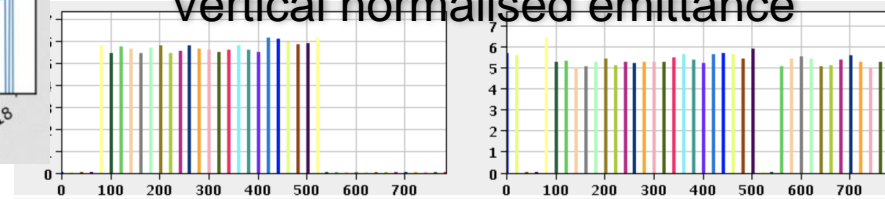


MTE high intensity tests

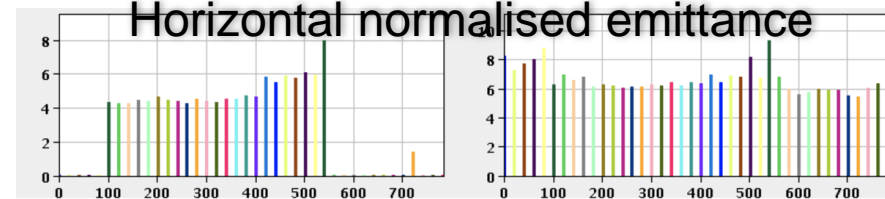
- Test in view of decision on removing CT equipment in PS
 - Lots of orbit adjustment as consequence of large vertical emittance - very well known limitation
 - Horizontal emittance as normal SFT beam
 - **$\sim 4e13$ p accelerated after transition, no unexpected issues in SPS**



Vertical normalised emittance



Horizontal normalised emittance



Horizontal aperture studies

- Asymmetric momentum acceptance in Q20 optics
- QD locations are critical (dispersion high horizontal aperture small)
- Detailed studies on horizontal aperture in QD show less aperture on inside – possibly due to design of MBB-QD vacuum flange transition (see presentation of Verena in a couple of weeks)

