SPS MD

1) check equippement!
2) MD request:

Subject of the experiment: Wire excitation and compensation experiments

General subject: LHC performance limits and evaluation of upgrade scenarios

Subject of the experiment:
Study the long range beam beam effect and compensation by wire excitation and compensation experiments like:
- Measure beam lifetime vs. beam-wire distance for different tunes to see whether different power laws seen at SPS (^5), Tevatron (^3) and RHIC (^2) and (^4) are tune related.
- Study sensitivity of final emittance to tune with and without BBLR.
- Measure lifetime as a function of the beam-wire distance at different wire currents
- Repeat tune scan of wire compensation at higher energy and with longer unperturbed lifetimes
- Noise studies (if more than 2 MDs)
- Study compromise between nominal and PACMAN bunches by partial compensation

Motivations of the experiment:

- Understand whether the LHC nominal LR effect creates a lifetime issue.
- If not, what determine the margin in crossing angle (by how much can it be reduced). If yes by how much shall the Xing angle be increased? Can we observe a clean threshold?
- Get a better understanding of unstable particle dynamics caused by the beam-beam effect.
- Is the inappropriate kick to the pacman bunches an issue? We could excite the SPS beam with half the nominal wire current and compensate with the full current to investigate a potential lifetime issue. We could then decrease the compensation current to search for a compromise between pacman and regular bunches.
- *Noise: What is the maximum acceptable jitter of a pulsed system? To carry out this experiment, we would need to inject noise in the BBLR (short-circuiting the inductance?) with a controlled amplitude and a pattern simulating a jitter (white noise?).*
- Test for further studies at RHIC: What should be expected at RHIC with a single LR encounter? This is easy to mimic in the SPS and we had occasional (but not systematic) signs of an effect at unexpected small excitation levels. Therefore the experiment requires cleanest conditions, i.e. again about 50 GeV.
- Benchmark beam-beam codes with experiment to learn the accuracy of predication and extrapolate for LHC simulations.
- Study whether a few long-range collisions at short separation are acceptable or not (to evaluate a early separation scheme.

Other participants (no carriage return, please)
Ulrich Dorda, Jean-Pierre Koutchouk, Jorg Wenninger, Frank Zimmermann, Guido?

Beam conditions (no carriage return, please)
parasitic MD at 26 GeV
dedicated MD ideally at 50 GeV

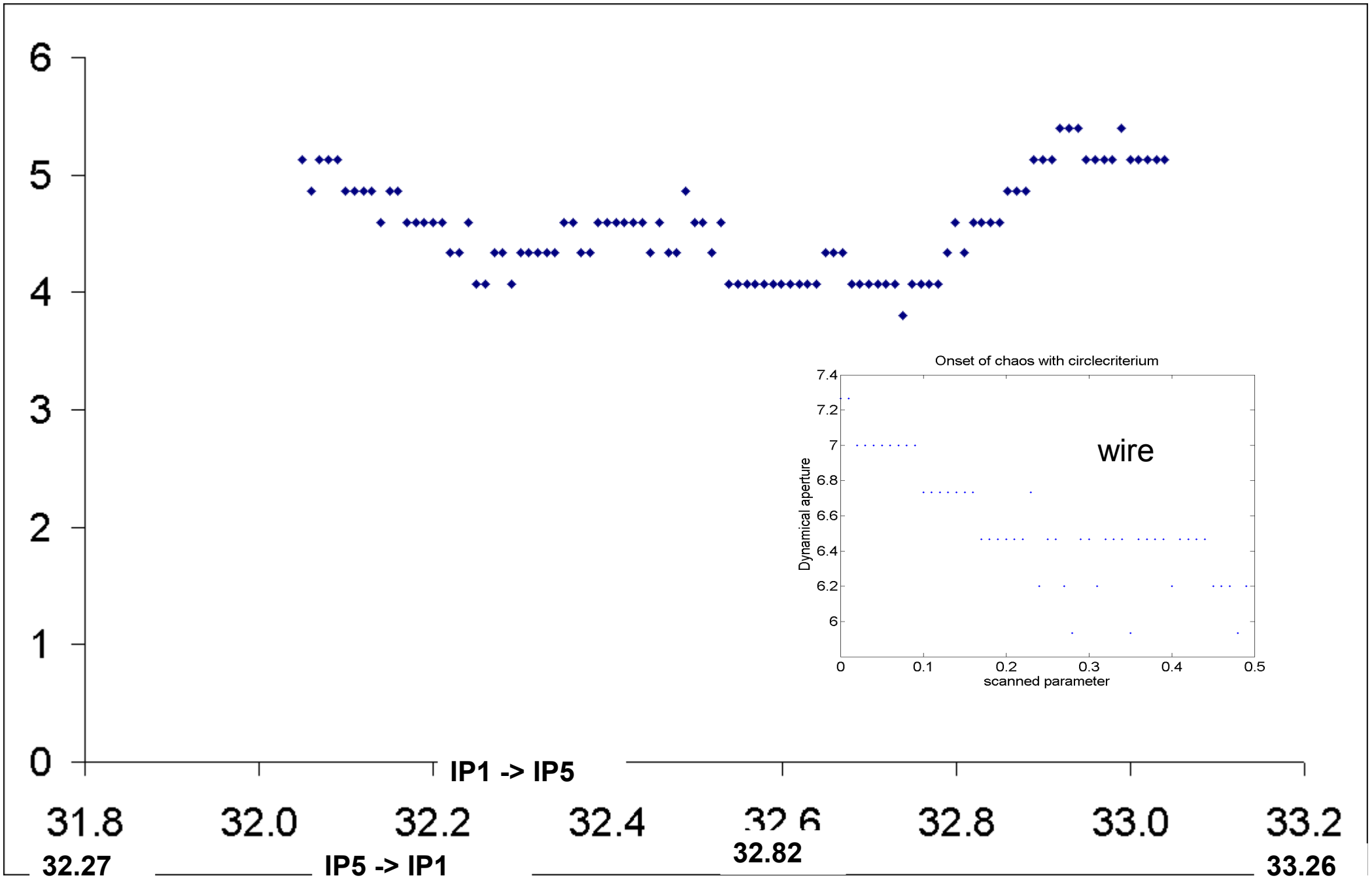
Parallel MDs: n. of sessions n. hours/session
?
Wednesday MDs: n. of sessions n. hours/session
?
Long MDs: n. of sessions n. hours/session
?
Preferred periods (no carriage return, please)
- not during: June 22- July 9 (Pac and BB- workshop)

Instrumentation requirements (no carriage return, please)
wire compensator, SPS Schottky monitor if available

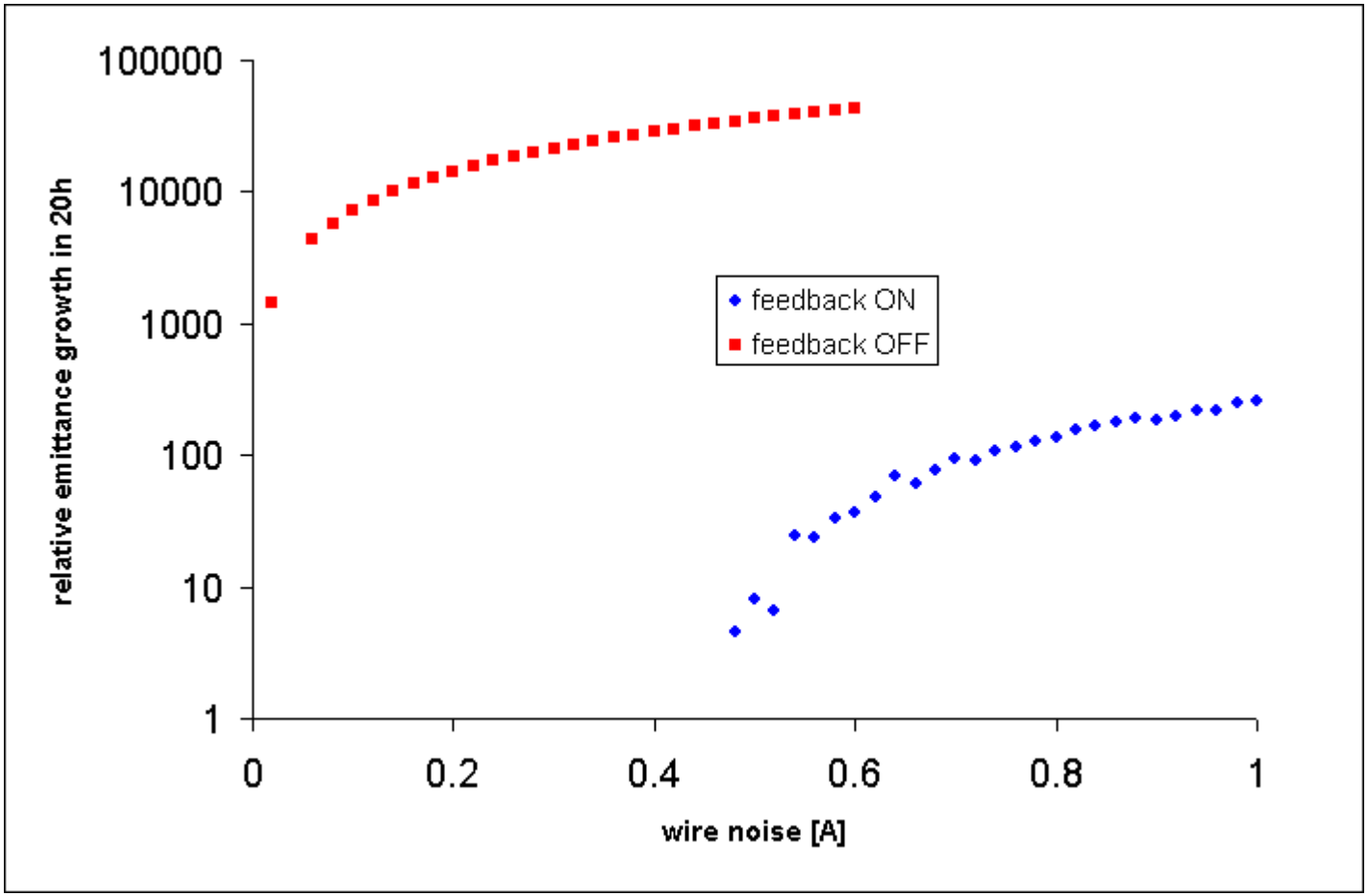
Previous publications on the experiment:
e.g.,
J.-P Koutchouk, G. de Rijk, F. Zimmermann, - Simulations of the LHC Long-Range Beam-Beam effect at the SPS, LHC Project note, 2002

Additional comments:
We would like to also use the SPS Schottky monitor if available

LHC, Phaseadvance between Ips, overall tune constant. IP1 and 5 only



Can we use the feedback to compensate for wire noise?



RHIC

MD-draft:

- experimentally detailed (I haven't got that experience!)

- Do experiments with low beam-wire separation make sense? (field pattern to differrent!
  -> Werner will be right to criticize this) , values for wire only?

- details to be discussed with modified proposal