- Tests of hollow e-beam scraping of proton beams for improved LHC collimation.

- Tests of crystal-based halo cleaning for improved LHC collimation.

- Tests of luminosity leveling with dynamic beta squeeze for future LHC performance upgrades.

- Measurements of equilibrium proton beam distribution for improved benchmarking of diffusion and halo models.

- Beambased measurements of the collimators' transverse impedance for an improved benchmarking of the impedance models used for the LHC.

  Contact: Elias Metral

  The transverse impedance in the LHC is expected to be dominated by the numerous collimators, most of which are made of Fibre-Reinforced-Carbon to withstand the impacts of high intensity proton beams in case of failures, and which will be moved very close to the beam, with full gaps of a few millimetres, in order to protect surrounding superconducting equipments. For instance, the imaginary part of the effective Broad-Band impedance is estimated to be $\sim 30 M\Omega/m$ for the squeezed optics at 7 TeV/c, which is larger than the value in the SPS ($\sim 20 M\Omega/m$). Furthermore, the subsequent transverse coupled-bunch instability is expected to be one of the main limitations to reach nominal luminosity. Therefore, detailed measurements at different energies (if possible) of the transverse single-bunch and coupled-bunch coherent tune shifts and instability rise-times (induced by collimators) vs. chromaticity and intensity could be interesting.

- Measurements of intra-beam scattering (IBS) with various intensities for improved benchmarking of IBS theory and models.

  Contact: Frank Zimmermann

  IBS benchmarking - measuring the horizontal, vertical and longitudinal emittance growth rates at injection and top energy as a function of longitudinal (and transverse) emittance. This could be done with a single non-colliding bunch. Comparison with analytical and numerical predictions.

- Measurements of beam-beam effects using an AC dipole.

  Contact: Ryoichi Miyamoto, Rogelio Tomás, Frank Schmidt

  Direct measurements of beam-beam effect in hadron colliders is not an easy task and we want to take this rare opportunity to try it out on the Tevatron. When the sustained large oscillations of the AC dipole are recorded by the BPM system of the Tevatron, with noise level of 20 microns and a memory size of 8,000 turns, we can observe small perturbations of betatron motion. We propose to utilize these systems and try direct measurement of linear beam-beam tune shift as well as nonlinear beam-beam resonances in the Tevatron.

- Measurements of beam-beam effects with various harmonic transverse perturbations for improved benchmarking of emittance growth models.

  Contact: Frank Zimmermann

  For the measurements with various harmonic perturbations. This needs colliding beams, and injection of the transverse harmonic noise (through the transverse damper) at different frequencies, inside and outside the betatron frequency spread, and in different frequency

regimes (100s of Hz, kHz, 1s of kHz), and ideally at different 'noise' amplitudes.

- Measurements of beam-beam effects for different schemes of transverse bunch splitting.

Contact: Massimo Giovannozzi

Recently the effect of crossing a stable resonance was used to extract beam over a few turns. This generates a special structure in the transverse phase space, as the beam is split into various beamlets depending on the order of the resonance being used. This effect was studied theoretically to propose a novel injection process aimed at reducing the space charge effects by shaping the transverse beam distribution. The current proposal aims at testing in the Tevatron the transverse splitting process and to measure the difference in beam-beam effects between standard Gaussian beams and split beams in the transverse (horizontal) plane.

- Collision schemes for sLHC: effect of Piwinski angle and longitudinal bunch profile on the beam-beam limit.

Contact: Frank Zimmermann

Measure beam lifetime and background rates as a function of crossing angle, as a function of bunch length, and as a function of longitudinal profile (Gaussian-like and flat - plus of course the production of bunches with these profiles), possibly also for different synchrotron tunes. The beam-beam tune shift for each measurements must also be known or computed.