Proposed beam-beam studies

HL-LHC WP2, task 2.5

Beam-beam issues for HL-LHC:

- **High intensity collisions with small β^***
    - ➤ Large crossing angle required
    - ➤ Geometric loss too large

- **Crab crossing required - effect on beam-beam interactions**

- **Luminosity levelling required - effect on beam-beam interactions**

- **Maybe beam-beam compensation schemes**

Planned subtasks:

- A. Effect of crab crossing on beam-beam dynamics (...)

- B. Revise parameters for performance optimization (luminosity reach) at 7 TeV (after LS1)

  → Strategy for upgrade

- C. Study and propose options for luminosity levelling (with impact on beam-beam effects)

- D. Self-consistent beam-beam calculations for A,B,C (emittance, coherent effects, etc. ..)

- F. Follow up wire installation and commissioning

Final aim: propose parameter set for high luminosity LHC

Studies in 2012 (Simulations and MD):

- Effect of noise on beam-beam interaction (crab cavities)

- Beam-beam interactions with (pseudo-)flat beam (smaller crossing angle, easier levelling)

- Improve the understanding of the limits due to beam-beam (head-on, long range)

- Alternative working points, half integer ..

→ Strong collaboration with other labs.

Home page for **WP2.5** (beam-beam):

https://espace.cern.ch/HiLumi/WP2/task5/SitePages/Home.aspx