Explain succinctly the role of the LBNL beam-beam computation efforts

- At the LHC, small (0.1 to 0.4 σ) variations in bunch-by-bunch transverse offset at the main collision points are unavoidable due to long-range collision pattern (W. Herr, T. Pieloni)

- CERN experts expressed a concern that this offset may lead to a sizable emittance growth, and requested that an independent study be performed using strong-strong simulation code.

  - "Existing simulations give contradictory results... A priori it is a single bunch effect which should be treated as a strong strong interaction, however we have some indications that the long range interactions play a role, in which case simulating the long range interaction as a non-linear lens may be not sufficient. This needs to be clarified." W.Herr, 4/2009

  - The goal is to confirm COMBI results with BeamBeam3D. The plan is
    - Emittance growth as a function of machine tunes and beam-beam offset.
    - Emittance growth with offset collision and crossing angle.
    - Emittance growth with offset collision and long-range beam-beam effects.
    - Multi-bunch simulation emittance growth with offset collision.