Summary of the LCU upgrade studies and next steps

- Four optics to be studied:
  - Three from AB (LHC Project Report 1008).
  - One layout from AT (LHC Project report 1000).
- Assessment made and results presented at LCU upgrade meeting (RdM) and LIUWG (RdM).
- Brief summary:
  - Compact and modular: Aperture limitations in LSS. Strength limitations in Q6. Proposal: drop any development.
  - Low betamax: Essentially OK (aperture limited in Q1). Proposal: pursue the optimization.
  - Symmetric: Essentially OK (aperture limited in Q4). Proposal: pursue the optimization.

Summary of the LCU upgrade studies and next steps - I

- In addition:
  - A different symmetric optics was found (SF).
  - Ezio proposed a revised set of triplets parameters to overcome the limitations of the AT symmetric optics.
  - At the LIUWG the analysis of the hardware constraint was presented. This sets the range of a a number of parameters:
    - Magnet aperture
    - Magnet length
    - Interconnection length
- In summary we should focus on two optics:
  - Revised low betamax.
  - Revised symmetric (merging the two symmetric solutions/layouts).
- In parallel, the work done so far should be published to set a milestone.

Summary of the LCU upgrade studies and next steps - II

- Revised:
  - Overcome the observed limitations in the optics.
  - Provide a complete solution compatible with the hardware constraints (cryostats parameters, instrumentation).
  - Study tunability of the optics.
  - Study injection optics.
  - Study squeeze sequence.
  - Evaluate the performance of a flat beam option.
  - Collimation performance.

Summary of the LCU upgrade studies and next steps - III

- Proposal (see next presentation by RdM) to have a modular approach to the matching, i.e., determine optimal exit conditions from triplet to avoid aperture problems in the LSS. This result could be used interpedently on the actual triplet layout.
- Responsibilities:
  - Low betamax: Rogelio (optics development).
  - Symmetric: tbd (optics development).
  - For the other aspects keep the matrix structure of current organization (e.g., beam-beam studies under responsibility of Werner and Malika).