Aperture measurements

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Goal and motivation of MD

- Triplet aperture measurements necessary to verify that sufficient margins are present for operation at given β*

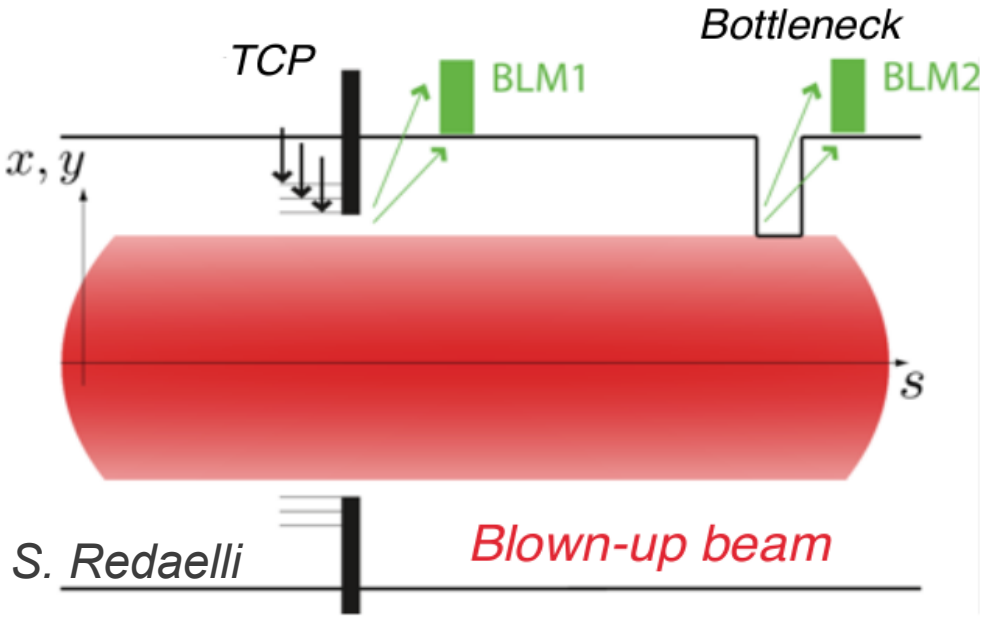
- Previous aperture measurement (see S. Redaelli in LBOC 2012.03.27, R. Bruce LSWG 2012.05.15) with squeezed but non-colliding beams at 4 TeV showed
  - there is enough aperture for operation at β*=60cm
  - puzzling result: Aperture bottleneck B2 found in IR1 (separation plane) both in B1 and B2 in different measurements, while IR5 (crossing plane) was expected
  - Goal: can we better understand this?

- In particular, we should measure both sides of the aperture (highest priority)

- Beam conditions: 7 pilots per ring of ~7e10, blown-up emittance (> 3.5 µm). Ramp, squeeze, but no collisions

Measurement procedure

- Beam based alignment of TCTs.
- Open all collimators except TCTs. (some time to gain here!).
- Blow up emittance with ADT to find bottleneck (on one TCT)
- Open TCTs in steps and repeat blow-up in each step
- When losses move to the aperture, the precise knowledge of the collimator gap gives the Nσ



- Need to correlate with opening of local TCT, not in other IR
- Repeat measurement for both polarities of the IR5 crossing angle
- If time, probe locally IR5 aperture by increasing crossing angle. When does the bottleneck move from IR1 to IR5?
- Required time: 1 shift. Presently allocated 23/6 – possible but not ideal (MG and RB not available)