Minutes of BGV meeting #3, 16/01/2013

Agenda page:
`https://indico.cern.ch/conferenceDisplay.py?confId=226115`

❖ Location for BGV installation

- Role of β not so dramatic for vertexing systematic (gain from larger beam is partially compensated by larger aperture → larger extrapolation distance)
- Identified and investigated 4 locations in IR4, able to accommodate at least one BGV system (need 7 meters)
- A fairly precise detector (hit resolution of 58 μm) of $|z_1 - z_2| = 1$ m, and outer of about 40 cm can provide the needed vertex resolution
- A "comparison table" is taking shape. See below for the info that is still missing
- Expectation for evolution of β in IR4: see below
- Detector: contact LHCb scintillating fibre experts (Lausanne) after mid-February

Info from Massimo (from email sent on 10/01/2013):

- The computations are correct (regarding the aperture). The contribution of dispersion is neglected, but it is small anyway
- Consider that IR4 is used to fix the tune of the machine. Furthermore, there are a number of optical constraints imposed by some systems, e.g., the transverse damper (phase advance between pick-ups and kickers). All in all, the situation in terms of optical flexibility is rather tight, in particular at injection. However, we should perform a study before giving a firm reply (BTW, how much is a "significant amount"?)
- The changes from ATS to IR4 optics are only on the right side of IP4 (i.e., in the part towards IP5), not on the left side
- **Addition during the meeting:** There would be changes after LS3 for sure (IP4.R) but only when $\beta^*_{IP5} < 40$ cm (and at top energy). Though there might be some other changes (still IP4.R) after LS1 already due to some use of "ATS-like" parameters. Task: to be clarified/explained by Massimo
- The projections for the emittance after LS1 are:
  - 1.4 μm for 1.15E11 p/b (25 ns spacing)
  - 1.2 μm for 1.6E11 p/b (50 ns spacing)
- Consider that the official emittance values for the HL-LHC era are:
  - 2.5 μm for 2.2E11 p/b (25 ns spacing)
  - 3.0 μm for 3.5E11 p/b (50 ns spacing)
- Therefore, it is unlikely to have emittances of 1 μm or smaller (apart, maybe, for very special running conditions, such as high-β)

❖ Vacuum Chamber

- The slides of Giuseppe show approximately how would one BGV vacuum system look like
  - $\Delta z \geq 7$ m
  - For CO and CO_2 target, the needed gas pressure is within the "acceptable" limits
- Discussions during the meeting:

- Must ensure that the reactivation of NEG cartridges will be possible/easy
- Highly desirable to have 3-4 different pressure levels in the chamber: can reduce pressure when we don't need high frequency measurements
- Reply of Giuseppe regarding the idea of single vacuum chamber for both beams: "the possibility of coupling the beam 1 and 2 vacuum imply much more integration studies with additional sector valves and instrumentations because it should be as a single vacuum sector"
- We agree that the baseline option is two separate vacuum systems (one for each beam)
- The wish is to have a single geographical location
  * cable spares can be shared
  * prototype equipment can be used first on ring1 and easily displaced to ring2 in a short access
  * assuming the advantages are not outweighed by other negative effects (optics ?)
- Study of the effects (on BGV and LHC) of long term injection can profit from a similar study made for the IPM/BGI

- Input for further design studies:
  - operation = 150 days / year (9 months * 30 days * 0.5 operation efficiency)
  - gas target = CO_2
  - pressure = 2×10^{-8} mbar

❖ AOB

- Next meeting: 30 January 2013, at 10:30