

Mean Vertex Calibration

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Online / Offline primary vertex determination

ONLINE: Mean Vertex SPD

It is done in the DA framework, it uses only the local online reconstruction of the SPD. The shuttle exports the values of the vertex in the OCDB (GRP/Calib/MeanVertexSPD). One mean vertex per run, not an event by event measurement!

The Mean Vertex SPD is then used as starting point (vertex0) for the vertex reconstruction and for the ITS Standalone Tracker.

OFFLINE:

- The MeanVertex SPD is computed offline using the full offline reconstruction and written in the ESD. Event by event vertex determination (only for pp and pPb).
- The Mean Vertex is the average vertex of the run obtained using the full reconstruction of global tracks (VertexerTracks algorithm). → More precise than the SPD vertex
- The VertexerTracks has the resolution to extract the luminous region. The luminous region is the real superposition of the two LHC beams and it is then used as constraint for primary tracks in the reconstruction of the vertex.

Mean Vertex offline calibration → luminous region measurement.

- The Mean Vertex calibration is performed offline in the CPass0 framework.
 - (GRP/Calib/MeanVertex)
- The position of the Mean Vertex is extract from a fit of the (x, y, z) distributions of the vertices of the run.
- The luminous region determination (x, y) is based on the deconvolution of the vertexer algorithm resolution (for the z coordinate this deconvolution is not needed)
- This deconvolution is based on a measurement performed as a function of multiplicity.
- The code deals with all possible colliding systems (pp-pPb-PbPb) because now it takes the beam type from the GRP, no an average multiplicity of the event! This is an important improvement to reduce manual calibration. **Now the manual calibration is needed only for those run for which the fit fails.**
- **For PbPb, the luminous region is estimated with very central events where the vertexer algorithm resolution is negligible (a fit is done but no deconvolution is needed)**

Mean Vertex offline calibration

- LHC15f calibrated ok in pass2
- LHC15g, h, i, l to be calibrated
 - For example LHC15l 14/106 runs failed ~13%
- LHC15m was PbPb quiet beam. No TPC, TRD → No CPass0. Evaluation of the vertex performances ongoing using ITS SA tracks
- LHC15n 30 runs. No MeanVertex failure. Checks on the values extracted ongoing, if everything ok no manual calibration needed.