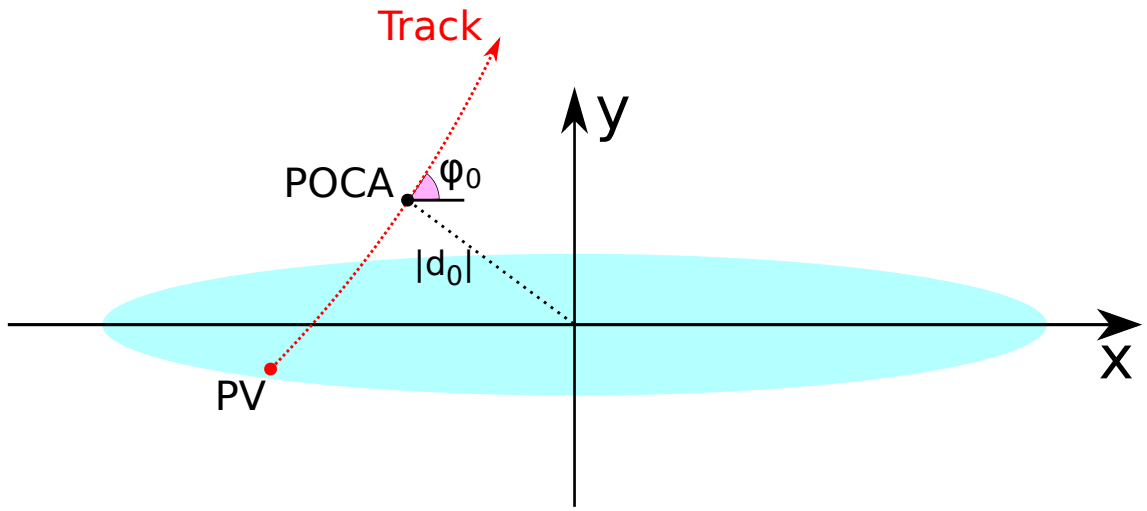

FIG. 1: Projection of the coordinate system on the x-y plane. For a track coming from a primary vertex (PV), the transverse impact parameter (d_0) is the signed distance between the point of closest approach (POCA) and the z axis, and ϕ_0 is the azimuthal angle of the track momentum at the POCA. The sign of d_0 is defined to be the same as the one of the z component of the angular momentum with respect to the origin. The blue area depicts the region where the high energy and low energy beams overlap; in this drawing, the vertical size and the horizontal size of this region are not in scale. In practice, the center of the overlap region is displaced with respect to the origin and d_0 needs to be corrected for this offset.

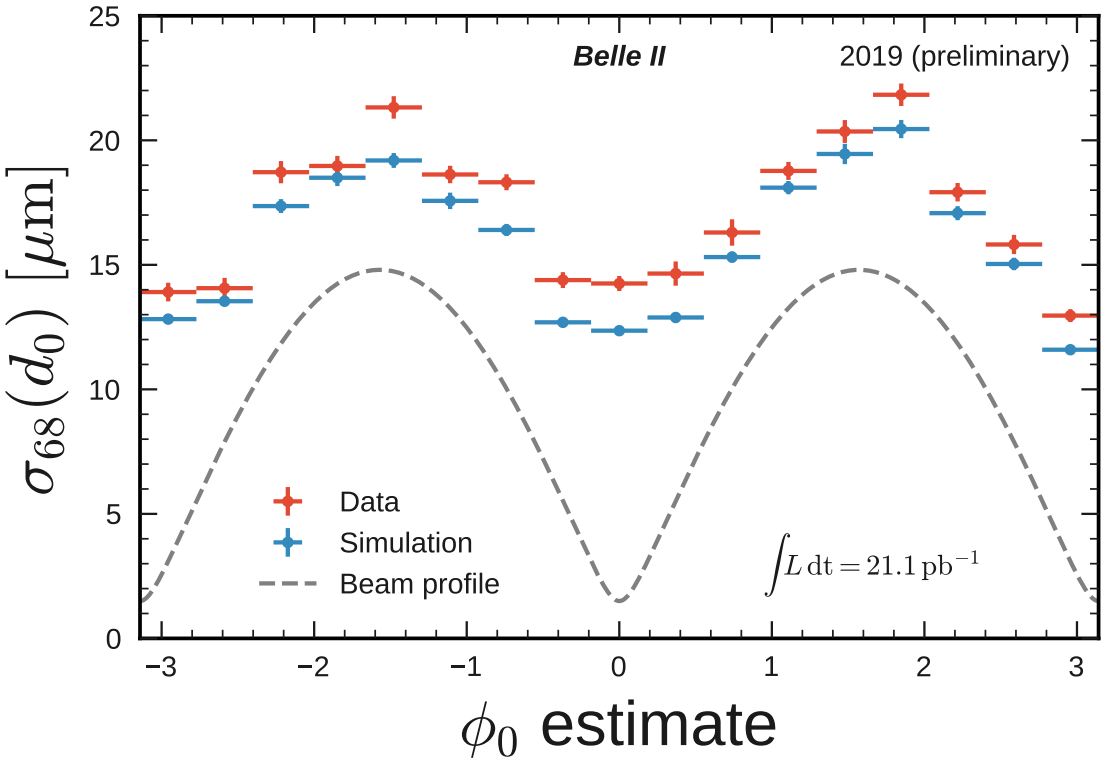

FIG. 2: In each ϕ_0 bin, the width of the d_0 distribution of selected tracks, noted $\sigma_{68}(d_0)$, is defined as half of the symmetric range around the median containing 68% of the d_0 distribution. A beam profile is drawn in gray; it corresponds to the function $\sqrt{(\sin\phi_0 \cdot \sigma_x)^2 + (\cos\phi_0 \cdot \sigma_y)^2}$ computed with $\sigma_x = 14.8\,\mu$m and $\sigma_y = 1.5\,\mu$m (set values in simulation). The fact that the measured points are above the gray curve comes from the finite resolution of the detector. The tracks are selected in a data sample collected in May 2019 (run list: 3689, 3714, 3715, 3718, 3719); in particular, it is requested that the tracks are detected by the PXD, the SVD and the CDC, and that they belong to two-track events. The same selection is applied to simulated tracks from a sample of generated Bhabha scattering events with e^+e^- in the final state.

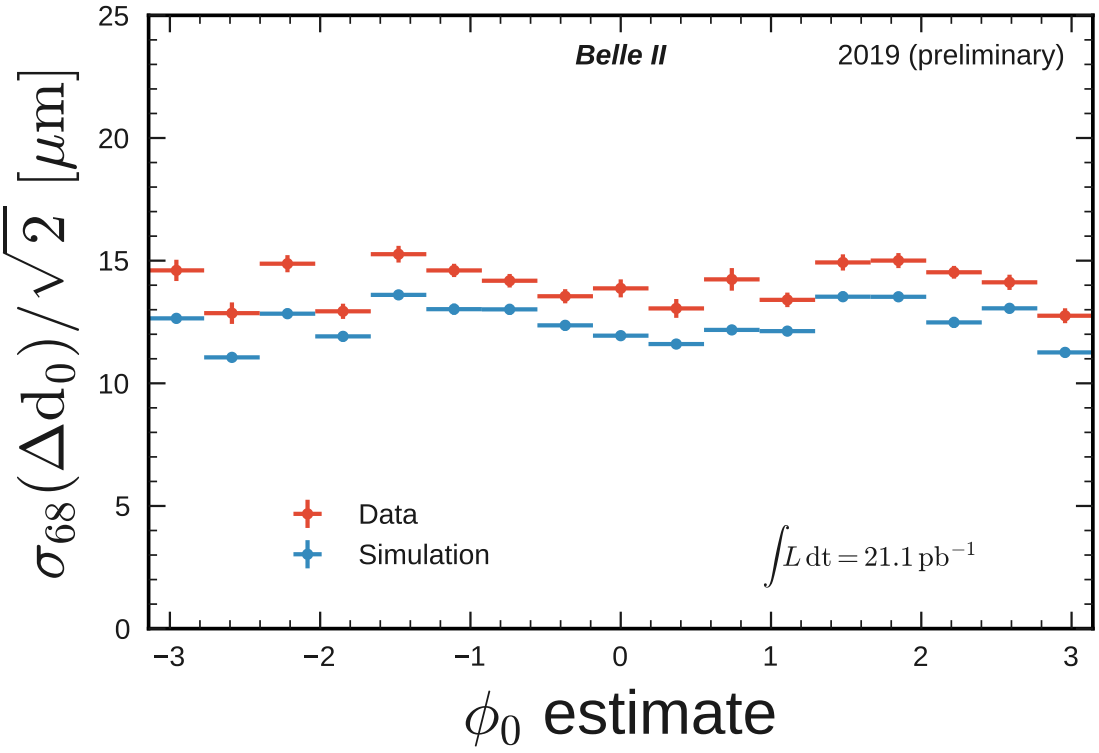

FIG. 3: For a two-track event where the two tracks, t_1 and t_2, are produced back-to-back, the definition of d_0 implies that $d_0(t_1)$ and $d_0(t_2)$ have opposite signs. Assuming that the two tracks come from the same primary vertex, the width of the difference $\Delta d_0 \equiv d_0(t_-) + d_0(t_+)$ divided by $\sqrt{2}$ is an estimate of the d_0 resolution. In each ϕ_0 bin, the width of the Δd_0 distribution of selected tracks, noted $\sigma_{68}(\Delta d_0)$, is defined as half of the symmetric range around the median containing 68% of the Δd_0 distribution. When computing the width of $\Delta d_0/\sqrt{2}$ over the full ϕ_0 range, one obtains a d_0 resolution estimate of 14.2 ± 0.1 (stat) μm in data and 12.5 ± 0.1 (stat) μm in simulation. The tracks are selected in a data sample collected in May 2019 (run list: 3689, 3714, 3715, 3718, 3719); in particular, it is requested that the tracks are detected by the PXD, the SVD and the CDC, and that they belong to two-track events. The same selection is applied to simulated tracks from a sample of generated Bhabha scattering events with e^+e^- in the final state.