

Questions and answers - James Libby Lecture 2

The following questions were submitted through Google Form. Some / all may have been answered in the Q&A session already. Nevertheless, we request our lecturers to provide written answers here for the benefit of those who could not attend that session. Thank you!

Slide 89. Slide says dominant uncertainty dominated by beam energy and momentum scale. How were these two determined and what are the prospects to improve them?

A lot of the uncertainty arises because we ran away from the peak of the $Y(4S)$, which means that the beam-energy calibrated to the B mass must be corrected. The correction accounts for the falling BB cross sections away from the peak, which means we produce more Bs with energies closer to the peak due to the beam energy spread of a few MeV. We need to know the BB cross section/ $Y(4S)$ lineshape well to correct for this effect. However, better, is that we will use data near the peak, which is unbiased in the energy calibration. We could get to 10s of keV with this.

The momentum scale can be corrected in finer bins of p and θ , possibly Φ , to improve further. This can be done with more data.

Slide 91. What are the Super-KEKB accelerator improvements planned?

During our second long shutdown (~2029) the goal is to improve the final focus so that we can reach the small values of β_y^* can be reached to obtain design luminosity of $6 \times 10^{35} \text{ cm}^2\text{s}^{-1}$. Prior to that we must improve the stability the stored beams and injection efficiency from the LINAC to sustain high currents to reach $2 \times 10^{35} \text{ cm}^2\text{s}^{-1}$ in the near term; this is already ongoing during our summer shutdown this year.