Spring 2025 Beam Background Major UH+ Goals

Participants: Qingyuan, Shashank (Andrii, Sven)

Shashank + Qingyuan: Get full TPC system running at KEK (during B2GM trip), Shashank be able to operate + calibrate (not urgent, but will also help understand analysis)

Shashank:

- First look at TPC data from last SuperKEKB run: obtain recoil energy spectrum + directional distribution
  - Use Jeff's procedure with minimal or no changes: 3d reconstruction, Particle ID, Head/tail
  - What do we see in the TPC on top of Belle II? → show at B2GM
  - Look at neutron rate vs beam current → show at B2GM
  - Compare against simulation
- Develop improved TPC analysis procedure: deconvolution to obtain primary neutron energy spectrum + directional distribution → publish (several papers potentially possible)
  1. Use derivative technique for energy spectrum: very simple, but results will be somewhat biased
  2. Implement deconvolution recipes in literature: already exist, but results will be somewhat biased
  3. Use ML → publish technique + demonstration separately?
- Global analysis of neutron backgrounds in Belle II (incl. KLM bkg rate change due to new neutron shielding) → publish

Qingyuan:

- ECL TRG
  - Refine: more intuitive display, better injection veto, high-statistics updated MC templates
  - Quantitatively estimate performance
  - publish
- Belle II Data/MC Study → publish (lead effort, but get Belle II detector experts to help)
- Inform the decision about collimator relocation (D06V2 → D03V4) : summarize the findings from the recent collimator study
- Give feedback on NLC performance
- Install new RAID when it arrives