Search for the rare decays $B \to K\nu\bar{\nu}$ at Belle II

Group Meeting - B2Knunu

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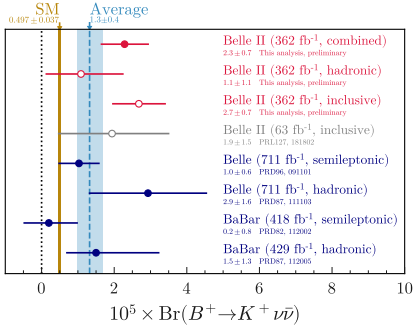
Belle II

State of the art

State of the art:

- Analyses carried at Belle II for Hadronic Tagged Analysis (HTA), Inclusive Tagged Analysis (ITA) and combined
- Decay channel: $B^+ \to K^+ \nu\bar{\nu}$
- Results:



Main goal

- Carry the same analysis for the Semileptonic Tagged Analysis (STA)
- Compare the results between the three analyses for completion with respect to the previous anaylises (BaBar and Belle)
- Will do for the decay channel $B^+ \to K^+ \nu\bar{\nu}$
- May also do it for $B^* \to K^* \nu\bar{\nu}$ (need to be done anyway by someone)

First approach

- Very similar to HTA since exclusive analysis
- Will use *semileptonic* FEI instead of hadronic
- Variable of interest for HTA: q^2

$\rightarrow$ Variable of interest for STA: q^2 and θ_{BY}

Quests

Main quests:

1. Take the previous workflow, understand it and automatize it using B2LUIGI (95% done)
2. Adapt the workflow to the STA (partly done by Jacopo)
3. Change the PID corrections to run dependent

Side quests:

1. Switch the plots from homemade functions (.png, burk) to PLOTHIST (.pdf, wow)
2. Change computation of uncertainties to more standardized way → may use SYSVAR if available
3. Use CABINETRY for management of PYHF fits
4. Check for usage of PYHFCORR for correlation in PYHF fits

Git repositories

Gitlab repository: