

TOF PID WG

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General Charges for the TOF-PID WG

- identify non-trivial differences between TOF designs
 - identify need of further optimization
- for each non-trivial difference prepare pro/con list accounting for technical performance risks and costs
 - decision on non-trivial differences done in consultation with the Project
- during the optimization process: continuous validation of performances for physics
- work closely with the Project towards the technical design
 - considering global integration
 - layout of ECCE in CAD to allow for detailed designs including support structures, front-end electronics, services

Charges and tasks (based on reference design)

- Finalize requirements on the time and position resolution based on physics requirements and performance (engage with physics, tracking, Cherenkov-PID WG): optimal and minimal scenarios
- Study and determine maximal material budget allowed without impacting the energy resolution of scattered electrons (engage with calorimeter WG).
- Investigate the pros and cons of pixel vs strip sensor options to arrive at the optimal design (engage with far forward WG to seek for a common solution if possible)
 - $O(\text{mm})$ vs $O(\text{cm})$ in length
 - Bump bonding vs wire bonding
- Study and determine maximal material budget allowed without impacting the tracking performance (engage with tracking WG)
- Investigate the requirements/constraints on the cooling and mechanical support
- Investigate the requirements/constraints on the service distribution, DAQ and detector integration (engage with DAQ, integration WG)
- Consider upgrade and staging options
- Investigate feasible fallback options to reduce the risk

Additional Charge Elements

- engage with Physics WGs -- in progress
- engage with Tracker and Cherenkov-PID WGs -- in progress
 - Tracker WG liaison: Nico Schmidt (ORNL)
- engage with DAQ WG
 - DAQ WG liaison: Tonko Ljubicic (BNL)
- technology considerations and choices – engage with relevant consortia
 - eRD112 AC-LGAD R&D
- integration, services – engage with the Project
- detector simulation – engage with software & computing
 - Simulation liaison: Nico Schmidt (ORNL)

Recent Progress

- Summary on TOF start time studies (ECCE) ([link1](#), [link2](#))
 - use scattered electron
 - “start-less” T0 based on all charged particle timing (pion assumption)
 - start time from machine clock
- Summary on material effects on electron EMC in ECCE design ([link](#))
 - good starting point to further investigate effects while improving support structure