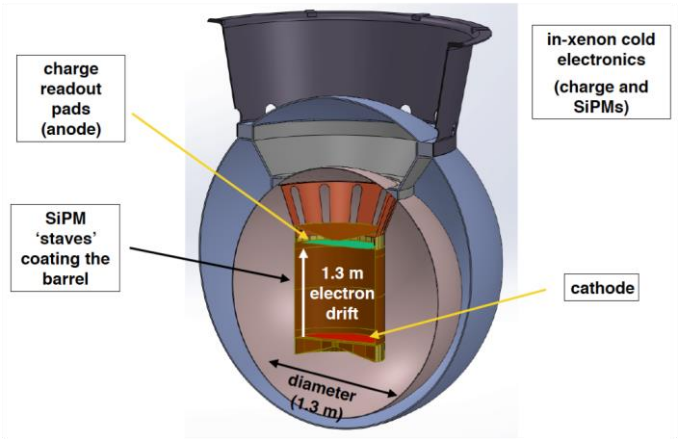
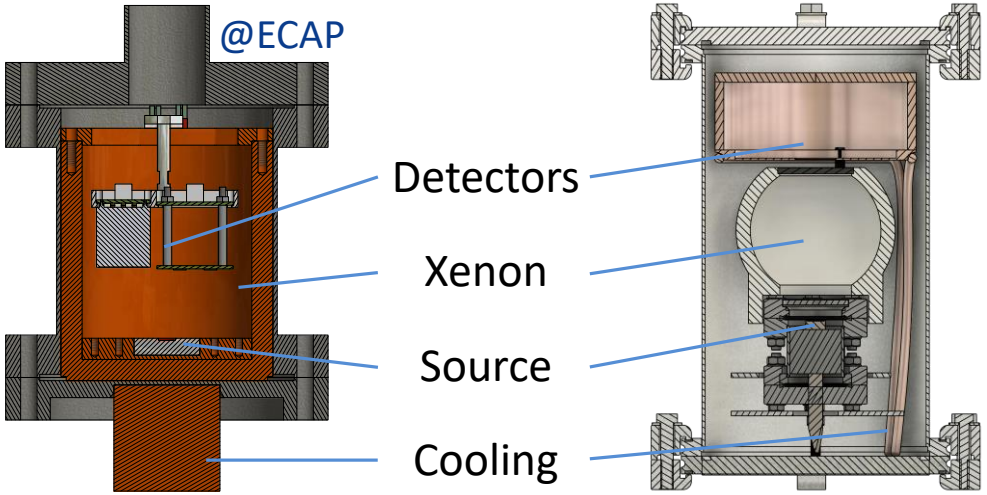
Characterization of VUV-sensitive SiPMs

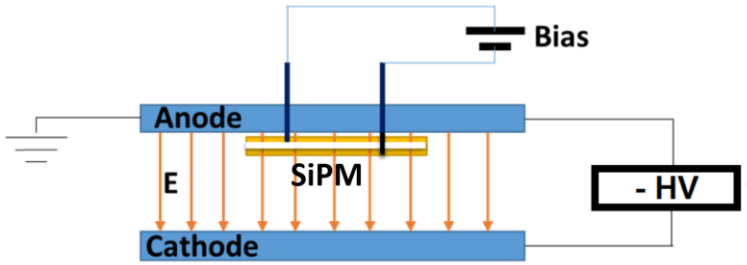
- nEXO is a next-generation tonne-scale 0νββ-decay-search experiment
- Silicon Photomultiplier are pixelated semiconductor photodetectors – suitable to detect the VUV scintillation light of events in the LXe

Various test stands to characterize SiPMs for (among others):

- Correlated noise
- Photon detection efficiency
- HV robustness







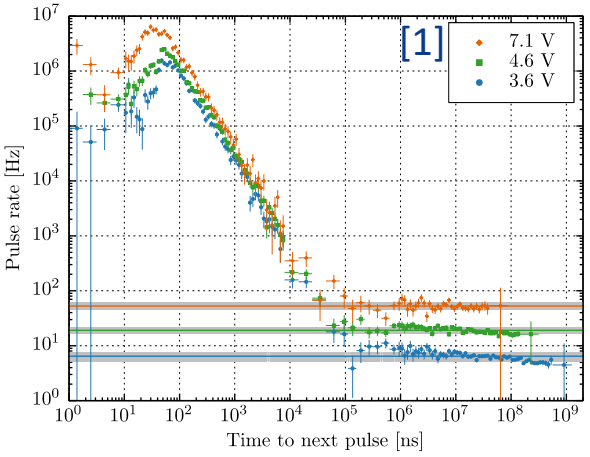
Characterization of VUV-sensitive SiPMs

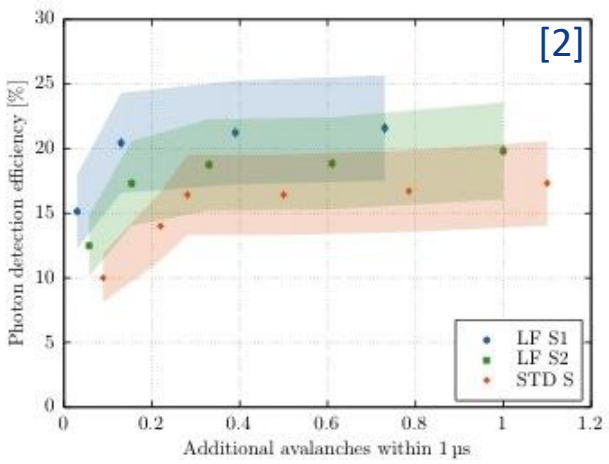
SiPM characterization:

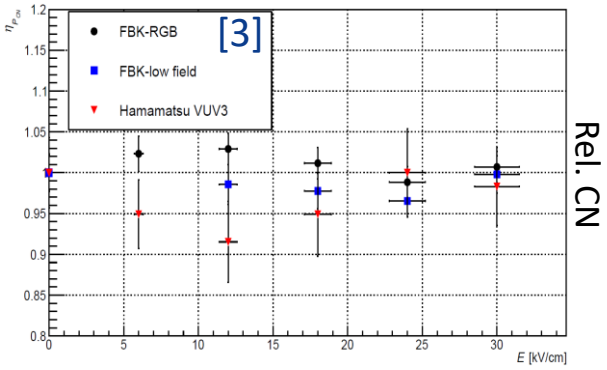
- Correlated noise (CN)
  (e.g. afterpulsing [1])
- Detection efficiency
  (over correlated noise [2])
- HV robustness
  (rel. CN [3], rel. PDE [4])

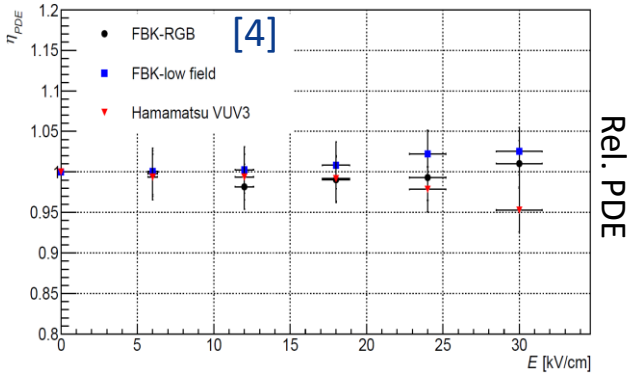
Goal: find suitable SiPM candidate for nEXO

- nEXO SiPM require-ments can be met:
  PDE > 15 %, CN < 0.2
- SiPMs operational in external electric fields without damage









References:

- Sensitivity: nEXO-coll. arXiv 1710.05075
- SiPM char.: A. Jamil et. al. (to be published)
- HV tests: T. Tolba et al. (to be published)