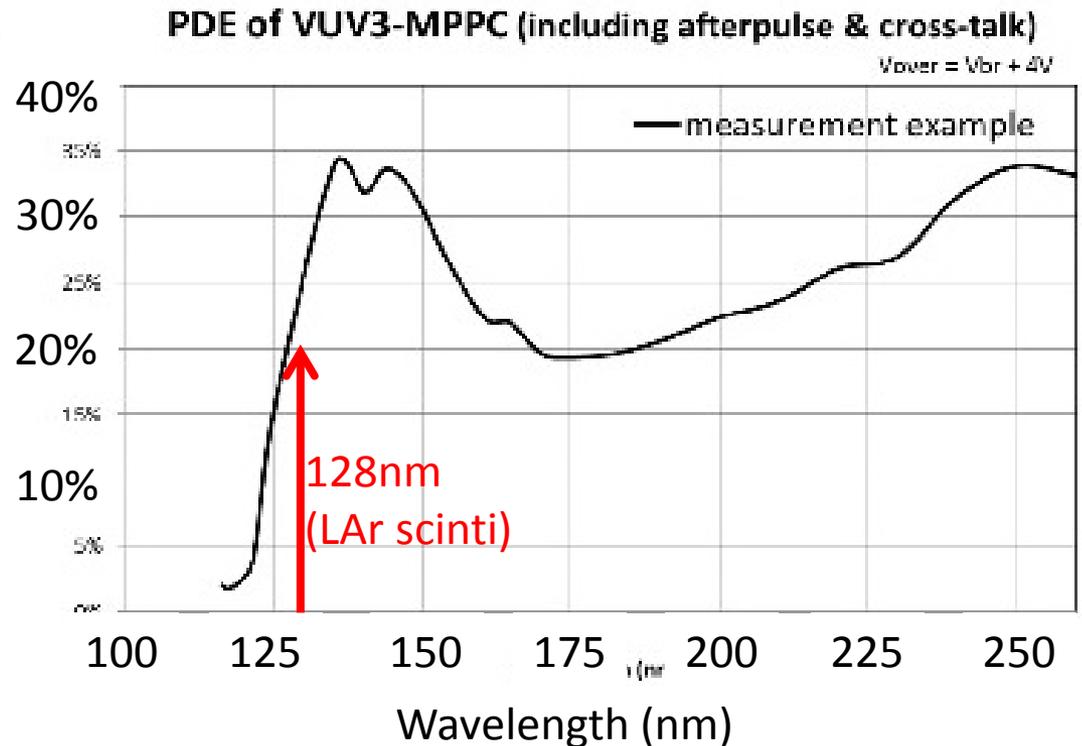


VUV (128nm photon sensitive) SiPM (MPPC)

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Introduction

- Now it is time to detect 128nm photon (scintillation light from LAr) directly w/ SiPM (MPPC). Close to be commercial
- For example, one Dark Matter search experiment in Japan (ANKOK, by Waseda University) is seeking for the possibility to use this kind of SiPMs. (see arXiv:1505.00091 [physics.ins-det] for more details)
- Right plot shows the typical Photon Detection Efficiency as a function of wavelength (nm).
 - ~20% PDE @ 128nm
 - <1Hz dark rate @ LAr
 - Gain $\sim 2 \times 10^6$ @ $4V + V_{br}$
 - Hamamatsu will provide four VUV SiPMs samples for LArIAT experiment.



Scientific merit and how to use

- We don't need any sophisticated technologies to put TPB coating. (evaporation or dipping)
 - We always have to consider to estimate the wave length conversion efficiency with using TPB for detector design or absolute measurement.
- Space and cost effective tool for trigger for neutrino physics due to large number of photons.
- We can compare light yield from direct photon and TPB photon in LArIAT if we use normal MPPC and VUV MPPC.
 - Any other ideas to use this interesting tool?



Time scale and caveats

- By beginning of Dec, Hamamatsu will provide samples after their checking.
- I will send the samples to FNAL immediately after providing if LArIAT allows to use this.
- These MPPCs have no resin window. (protection window)
Handling should be very careful
- There are two 100um pitch MPPCs and two 50um MPPCs (active area is 3mm x 3mm) ■ Dimension
- 100um ones have better PDE than that of 50um, but the time response of the MPPCs are worse because of the capacitance.
- Paper's authors said that this MPPC has very weak against the radiation damage. (even the Cf neutron make damages to the MPPC.)

