Micro-pattern Gas Detectors for Fast Timing Work Package

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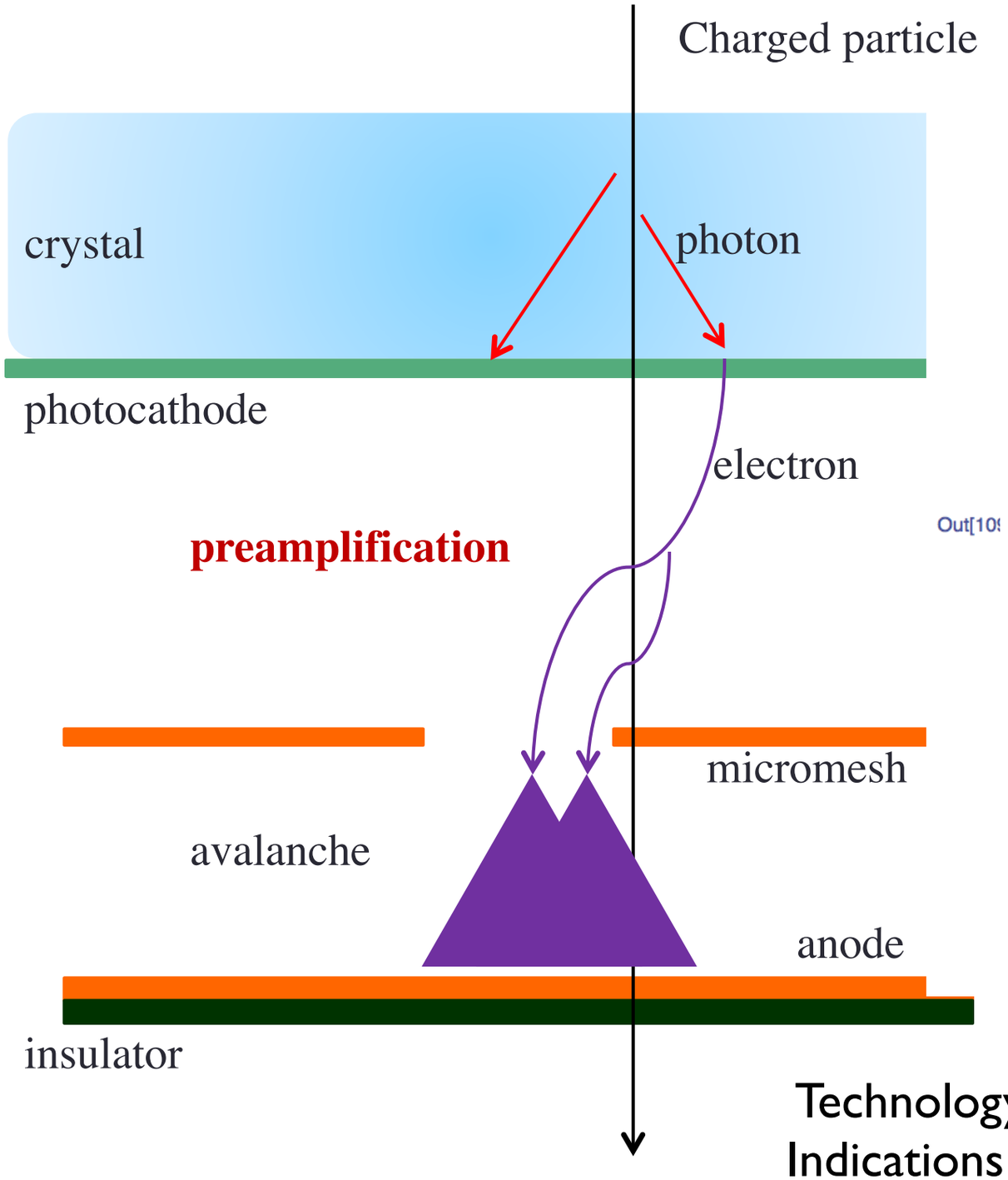
Please read supporting materials WP first!

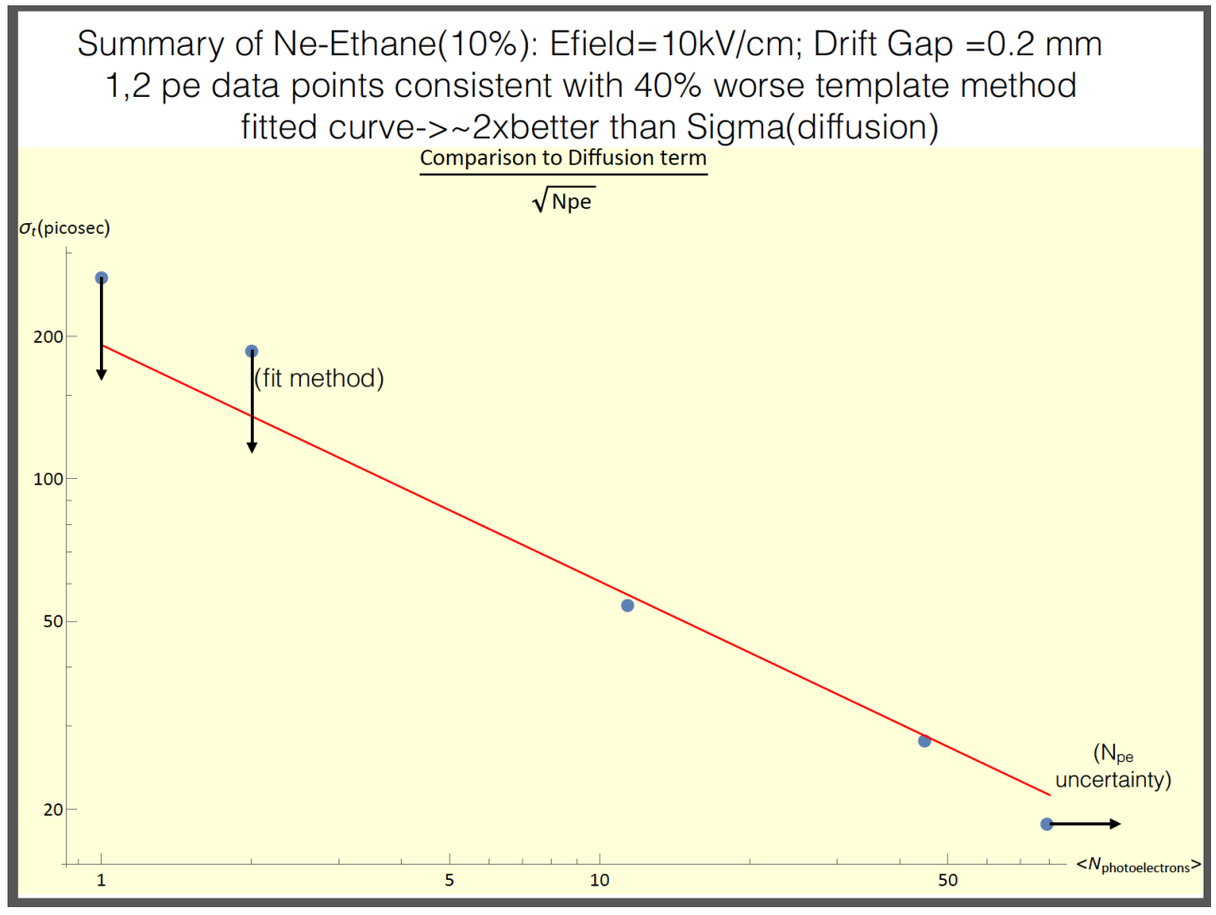
Technology Recap

S. White arxiv:1409.1165, arxiv:1601.00123

First developed within context of RD51 collaboration.

Promising technology for a MIP timing layer.





Technology tested on bench, can yield 30ps timing for MIPs.

Indications from simulation that 3x improvement is possible.

(recap)

Rough Estimate of Materials Cost 1

- MPGD Fast Timing Detectors
  - ?x single channel MPGD devices (spares?) = $????
  - 1-3x variant, MgF_2 window and CeI coating, = $????
  - 1x 16 channel array for testing = $????
  - $????? in total for a suite of radiation tests, coordinate with Sebastian, LG

Detail of Work Package

- **Summer, 2016** testbeams and laser studies
  - Profit from AIDA, RD51, CERN, FNAL testbeams
  - Try to be part of CMS fast-timing test beams where possible
  - Continuation of laser studies at Saclay
- Device: evolution of CEA Saclay laser test setup, example: https://goo.gl/0OXZUU
- Detectors assembled by Hamamatsu
  - Assembly for support structure/shielding???
- Data analyzed to demonstrate proof of principle for MPGD fast-timing detector in beam
  - 30ps timing resolution, expecting 3x improvement from sim.
  - Also investigate performance of 16 channel array (made by HPK)
- Results available in Fall, to be followed up by radiation studies
  - analysis by FNAL/Princeton/CERN/Saclay
- Total M&S: **$????**, Total Labor: **$????**