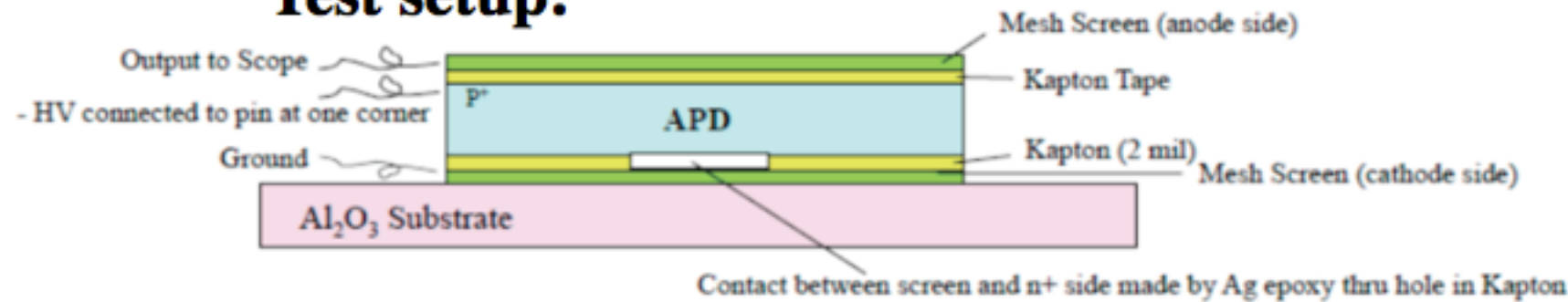


Si detectors: Medium Gain Avalanche Diodes (AD)

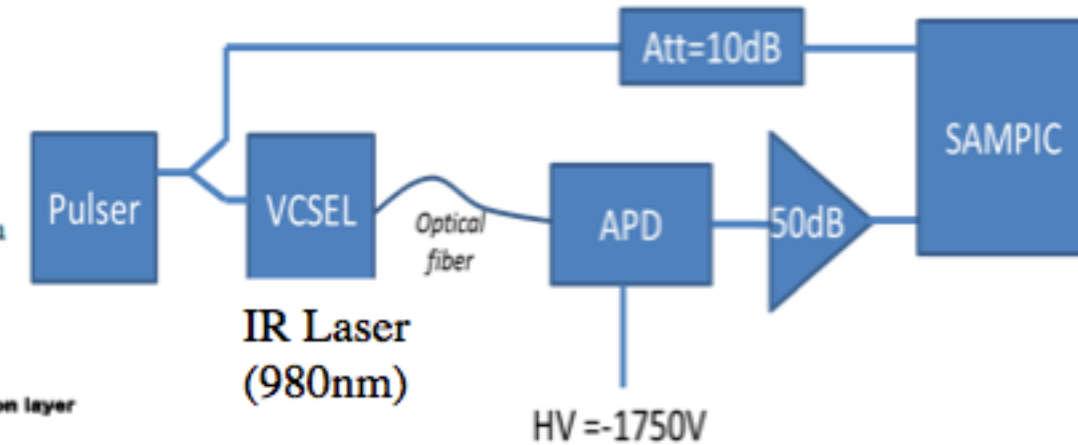
RD50: M.Moll, Torino Workshop 2016 & E. Delagnes and S. White, Princeton Univ., publication coming

Test setup:



Laser test:

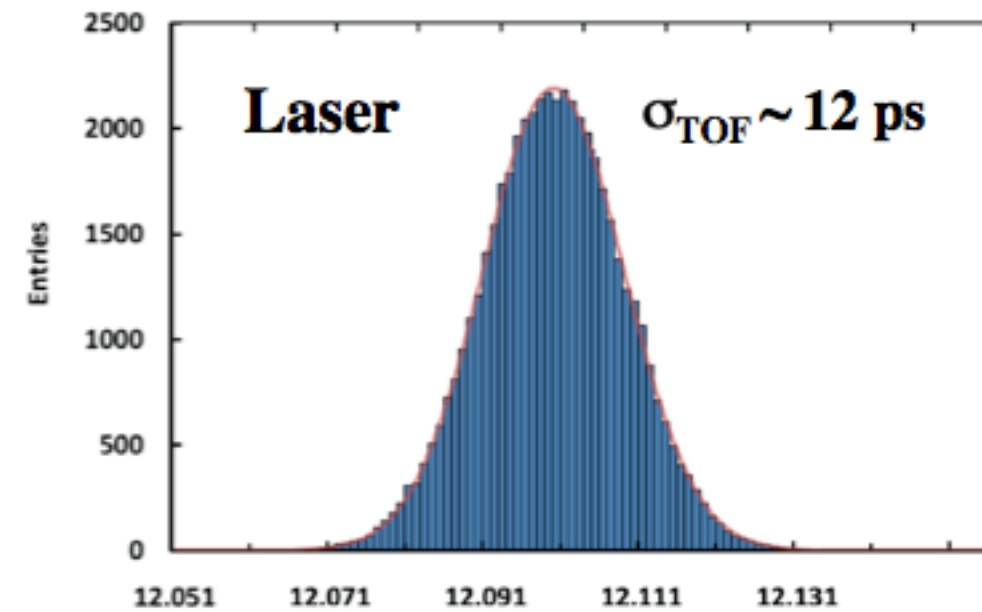
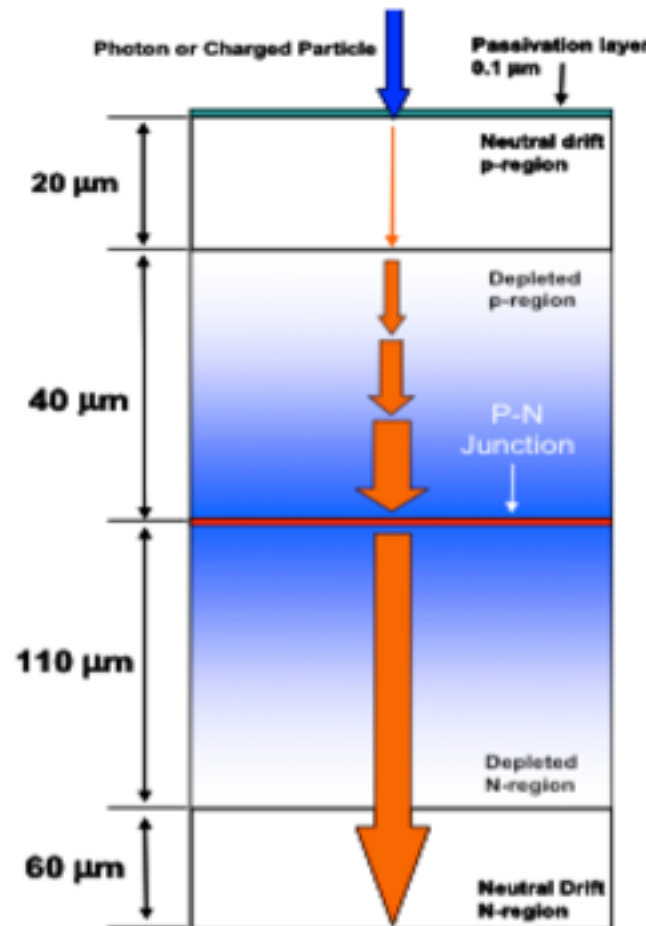
Very preliminary !!



Main points:

- **Overall aim: Not yet clearly defined**
- **Laser setup simulates MIP signal**
- APD requires HV voltage: $\sim 1750\text{V}$
- There is a large field: $E \sim 15\text{kV/cm}$
- So called “**Deep Depleted**” APD technology
- Amplification deep inside the bulk of the sensor
- **A significant gain on APD: $\sim 200\text{-}500\times$**
- Placing a mesh above a dielectric and reading the signal capacitively improves speed ($t_{\text{rise time}} \sim 1.2\text{ ns}$).
- 1 GHz BW Wenteq ABL0100 amplifier (50dB),
- SAMPIC, 6.4 GSa/sec, 156 ps/step (D.Breton)
- Radiation hard (proven to 10^{14} p/cm^2)

AD principle:



$$\text{TOF} = t_{\text{trigger}} - t_{\text{APD}} [\text{ns}]$$

- Timing resolution obtained with **laser** producing a **MIP eq.:**
- Test beam result is on the next page.

$$\sigma_{\text{TOF}} \sim 12 \text{ ps}$$