HyperFast Silicon Plans

RD51 mtg. CERN, Feb. 22 '18   S. White
for CERN-SSD, Delhi, BNL Instr.,Princeton,Penn, UVa

July/Aug 2017 PICOSEC data
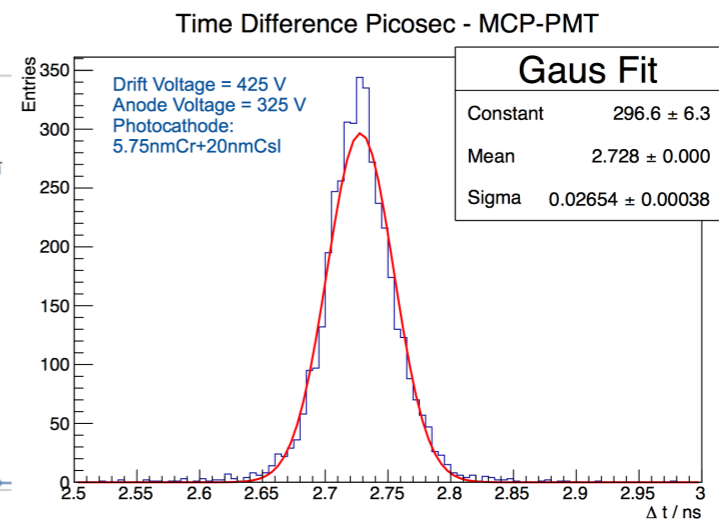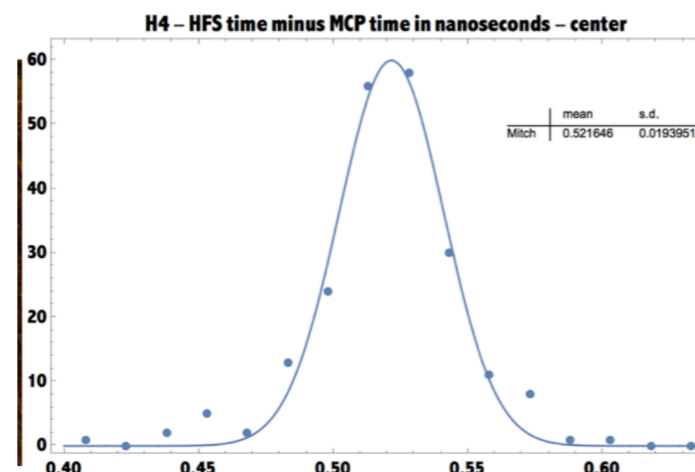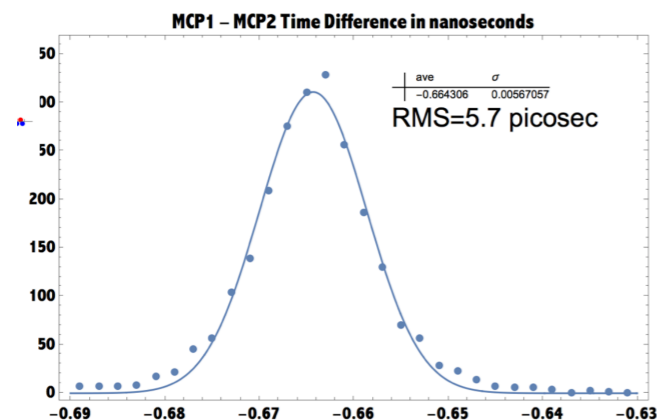
4x 6micron HPK MCP 's +3mm Quartz (measure ~4 picosec)

HyperFastSilicon(HFS) (mesh readout DD-AD) 64 mm²/pixel (measure<20 picosec)

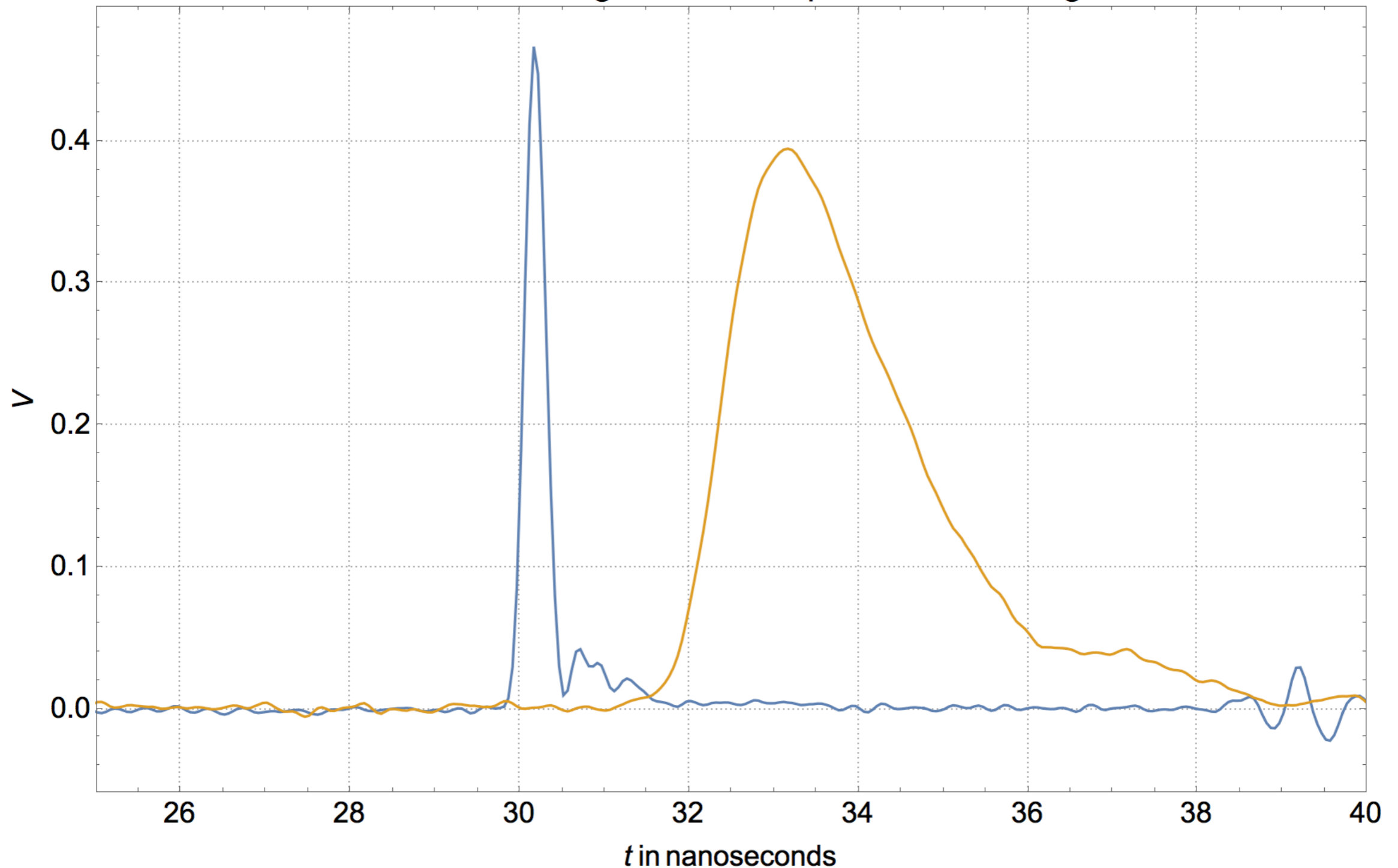**MMegas-based "PICOSEC" 80 mm² pixel** (measure<25 picosec)

10 pad "PICOSEC"

# HFS has unique (among Si detectors) speed and SNR

Laser and HFS signal, 1 MIP equivalent, −20 deg. C

what is missing?

- full characterization of radiation hardness

- model of limits to timing charged particle (a la PICOSEC)

to address rad hardness we developed new preamp to allow removal
of sensors for irradiation at Ljubljana Triga reactor
currently in production at CERN PC board shop
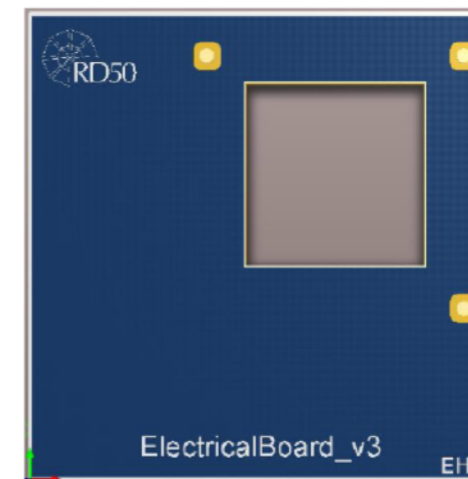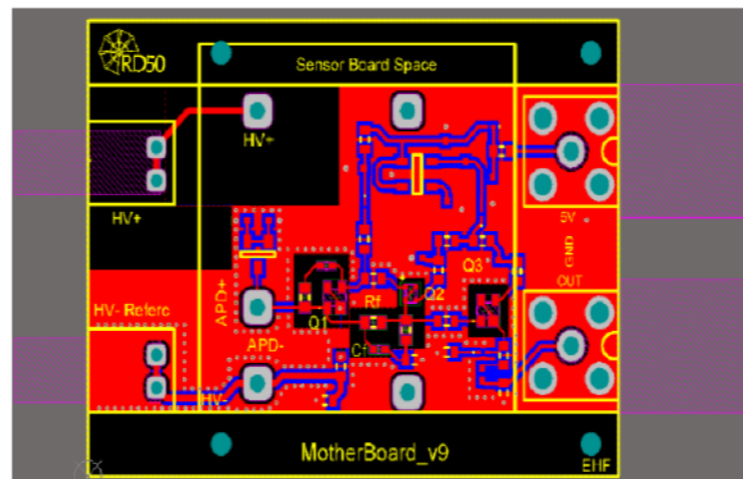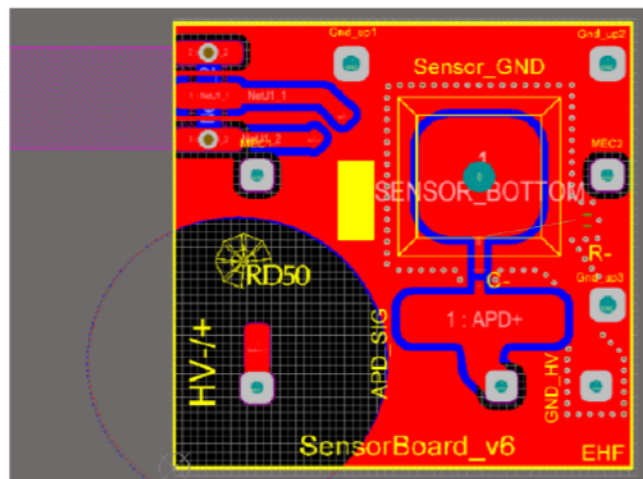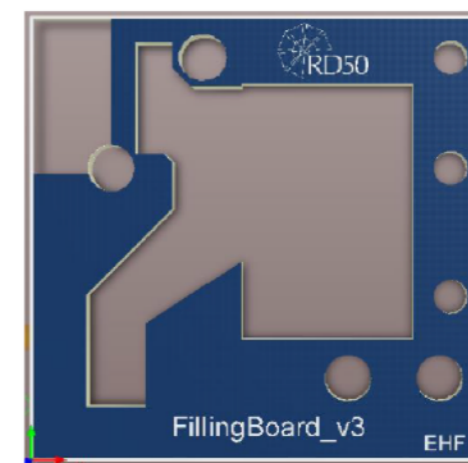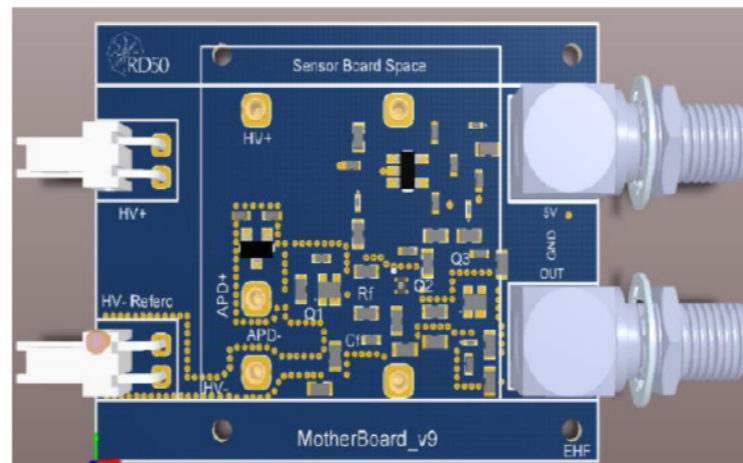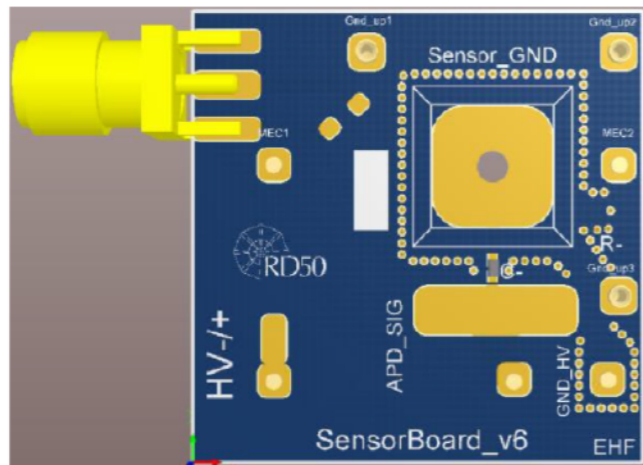
testbeam plans for '18

- rad hardness characterization of timing will require early baselining of several sensors (possibly in April/May) then remeasurement after irradiation (Aug or September).

- work on modeling continues (new release of Bichsel code by Su Dong). There are 2 aproaches

  - "weightfield 2" and ongoing work in SSD and Delhi

- trying also to develop model relayed strategy using ML techniques on large existing data set we took in PICOSEC