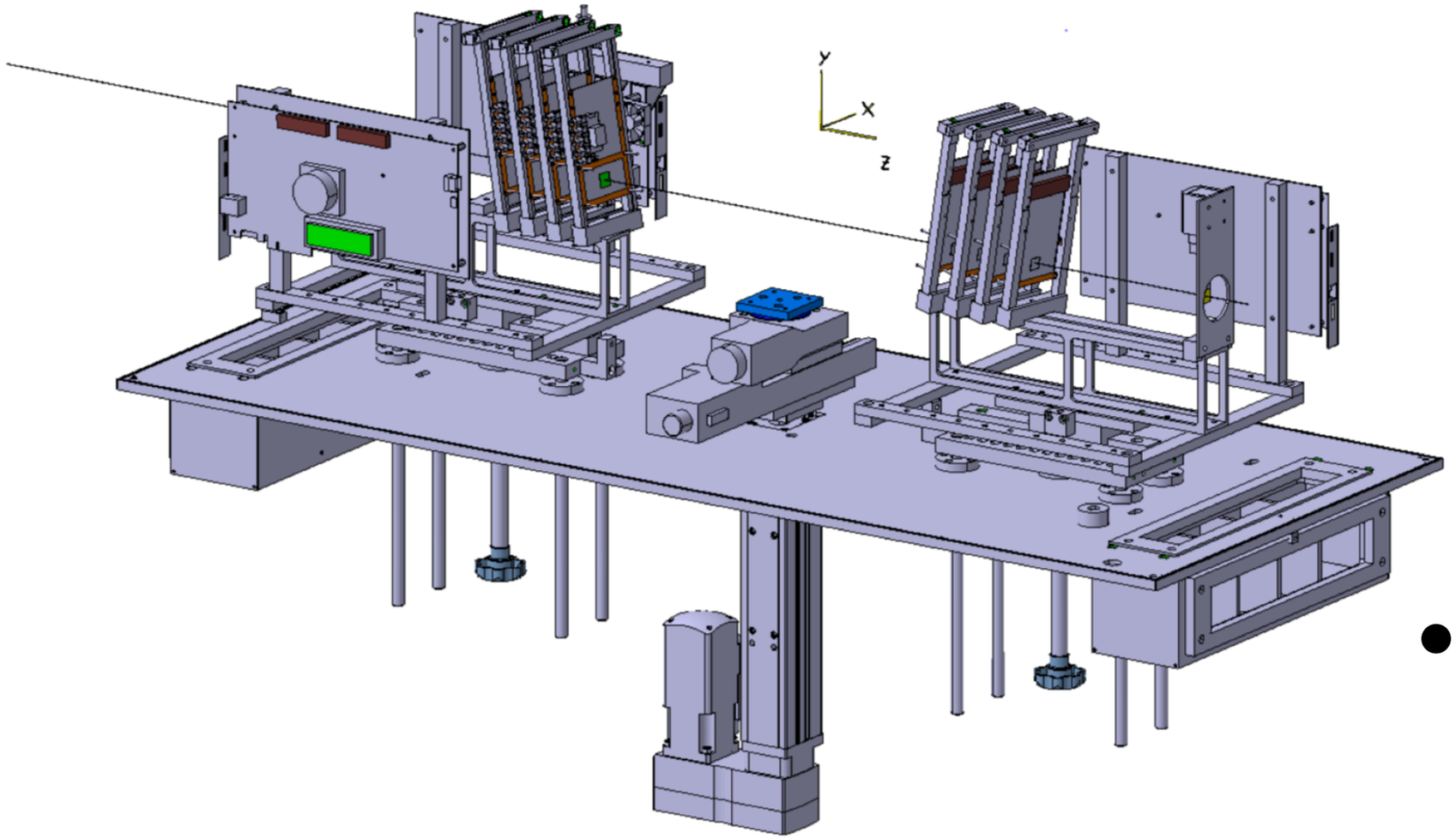
Timepix4 telescope intro

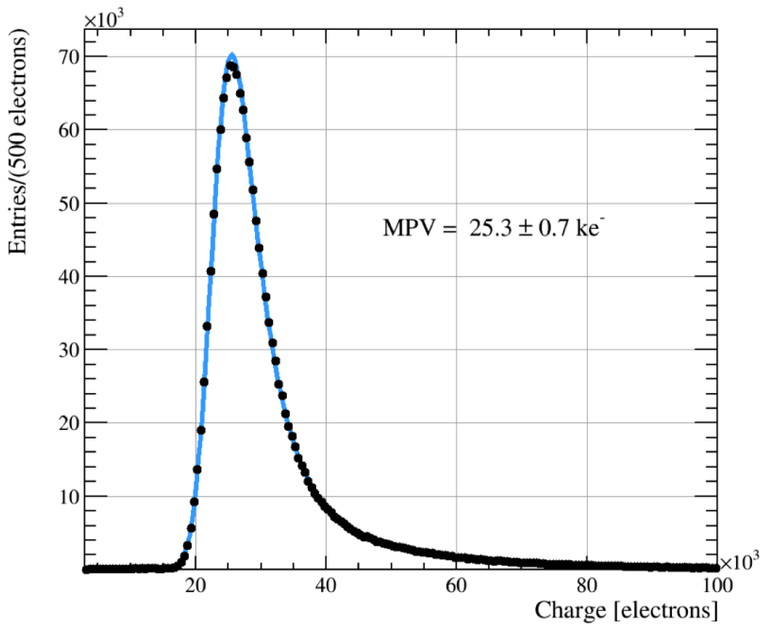
17 March 2020

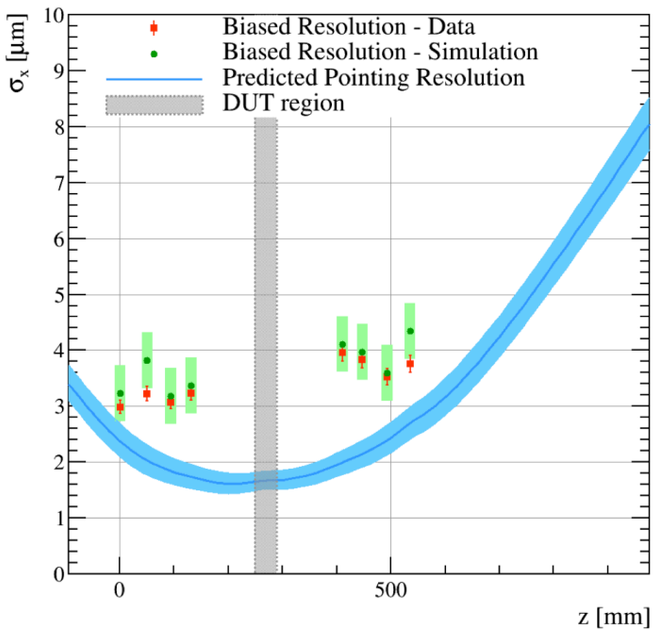
https://arxiv.org/pdf/1902.09755.pdf

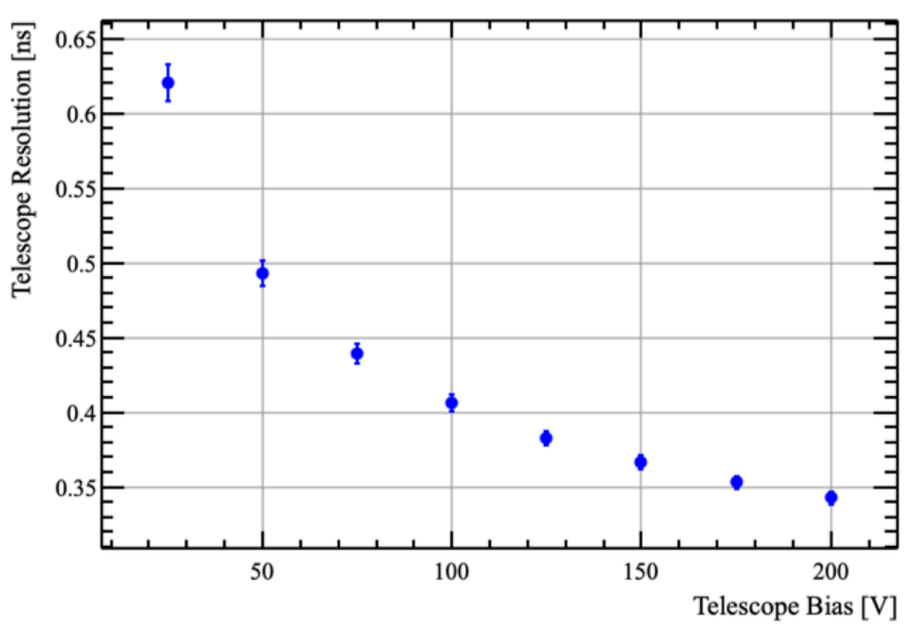
Build on experience of Timepix3 telescope



- timing resolution:
  - 990ps/plane shown
  - infer 350ps/track
- pointing resolution ~4μm







Timepix4 telescope

- Aims to be the workhorse test bench to charaterise novel timing detectors for:
  - timing performance (resolution, timewalk...) below 100ps
  - pixel structure, edge einefficiencies, 3D sensors
  - performance at various incident angles
  - high rate performance, commensurate with 40MHz

- The Timepix4 telescope specifications are:
  - timing resolution below 50ps
  - spatial resolution below 2μm
  - high rate performance above 10MHz

Timepix4 telescope status

- Expression of interest made to AIDANova in summer 2019
- Participants: Nikhef, CERN, Oxford, Santiago de Compostela + 2 industrial.
- AIDANova money is mainly for purchase of chips, readout, and other dedicated equipment, person power comes from matched funding undertaken by participants.
- AIDANova was over subscribed by a factor 3. We have been a third of our request.
- This sum is considered subcritical. Participants are looking for alternative capital funding

- Vital to have this demonstrator. Excellent hands on experience for any student.
- As for schedule. Obvious uncertainty. late 2021? 2022.

Oxford interests

- Research interests in both LHCb UII and TauFV vertex detector technology
- Only UK university participating in Timepix4. Lead: Richard Plackett
- Richard interested in building the/a telescope. Unitarity issues with ATLAS pixel construction and other projects.
- High quality facility in the OPMD, cleanroom, wire bonding, probe station, X-ray source, metrology, robotic construction.
- Wider interest in fast silicon e.g. Daniela wish taking a student exclusively on LGAD development

- Through LHCb-UK we are plugged into UK efforts to develop pixel LGADs (main thrust at Glasgow). Expect closer coordination once devices are available.