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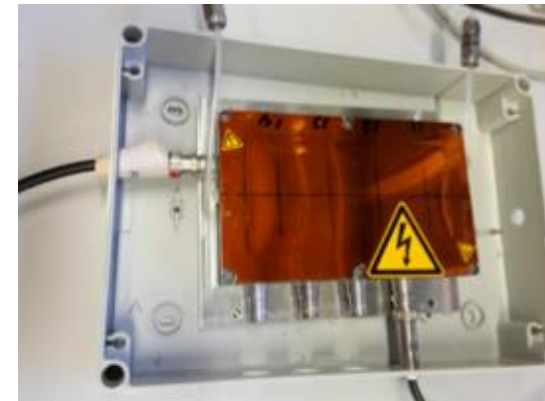
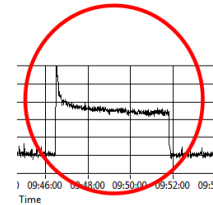
- GridPix improvement of resistivity TPX3 layer SiN
- Ion Back Flow measurement Quad
- Negative Ion Pixel TPC tests
- TimePix4 potential
- Test beams 8-Quad module

GridPix improvement of resistivity TPX3 layer SiN

- In the post processing a resistive layer is put on the TP3 chip
- This protects the device from sparks
- In the quad beam tests it was found out that the SiN layer charges up at very high rates (10 kHz)
- Yevgen is investigating how to reduce significantly the resistivity of the SiN layer; this will reduce the charge up
- Different trial samples will be made in 2020
- Production of TPX3 wafers with InGrids @ IZM Berlin
- Bonn will have a new Detector Lab Summer 2020

- Ion Back Flow are the ions created in the avalanche process that flow back in the TPC volume
- For the use of a pixel TPC at the CEPC it is important to know and reduce the Ion Back Flow (IBF)
- It is in general known that a Grid Pix has a low IBF probability $O(0.1\%)$
- It is possible to measure the IBF using the Quad. One can extrapolate this number to the current operation point at a gain of 2000. This will be done beginning 2020

- There is another application for a pixel TPC using negative ions
 - The idea for a NITPC was presented by Martoff et al. in NIMA A 440 (2000) 355
 - Use a gas CS_2 (SF_6) here negative ions are formed. They drift slowly to the read-out plane. These gasses have a very small diffusion coefficient: high resolution - interesting for pixels
 - NITPC with GEM read-out experiment for dark matter searches Drift IIb
- Fred started to look whether one could use Ar- CS_2 98.8/1.2 gas mixture and run it at atmospheric pressure.
 - Indeed signals were observed with a 90Sr source for a V grid -370 V. Similar signal as the standard T2K gas.
- Will proceed in 2020 to test a single chip
 - measure the diffusion "very thin" laser tracks ...



- Advantages of the Timepix4 (see also Fred his talk)
 - Larger area than TPX3 about factor 3.5
 - Better connectivity more space
 - Lower power consumption (0.55 W/cm^2) than TPX3
 - Possible use of Through Silicon Vias (TSVs)
 - Current Quad coverage is about 69% could reach $> 90\%$
- Start with TPX4 when available; surface is equivalent to Quad
 - Can use simpler PCB (significant cost reduction)
 - Don't need multiplexer to combine TPXs
- Several years effort: need to get some steps approved in running of 2020
 - Will organize a brainstorm meeting with Bonn, Nikhef R&D
 - Support will be easier with ILC approved or CEPC funding

- It is important to test the 8-Quad module in a test beam
- The multiplexer that combines the signals from different quads needs to be operated and commissioned
 - Expect this to happen beginning 2020
- Probably we will perform a pre-test for the test beam, either at DESY running parasitically, or in Bonn before the Summer
- The ultimate test beam in DESY is now scheduled for August 2020
 - We will take data with a silicon telescope that will allow us to measure the deformations for a module (see Critical Items ... <https://agenda.linearcollider.org/event/8362/contributions/45065/>)