

Tests with IZM-7

IZM-7 is the first batch of Timepix-based GridPixes which were entirely produced at IZM including for the first time also the SiN layer. We have been successfully testing two IZM-7 GridPixes with a 4 μm protection layer. Both GridPixes were mounted in a CAST-like detector with a drift distance of 3 cm, an Ar: C_4H_{10} 97.7:2.3 mixture and a drift field of 500 V/cm.

1.) E2-W69 has been tested with moderate rates of X-ray photons in the energy range of 500 eV to ~ 10 keV for more than 3 weeks. The grid voltages have been varied between 280 V and 340 V (estimated gas gain of 1000-8000).

The occupancy looks nice except three little spots and gas gain seems to be homogenous throughout the area (see left figure 1)

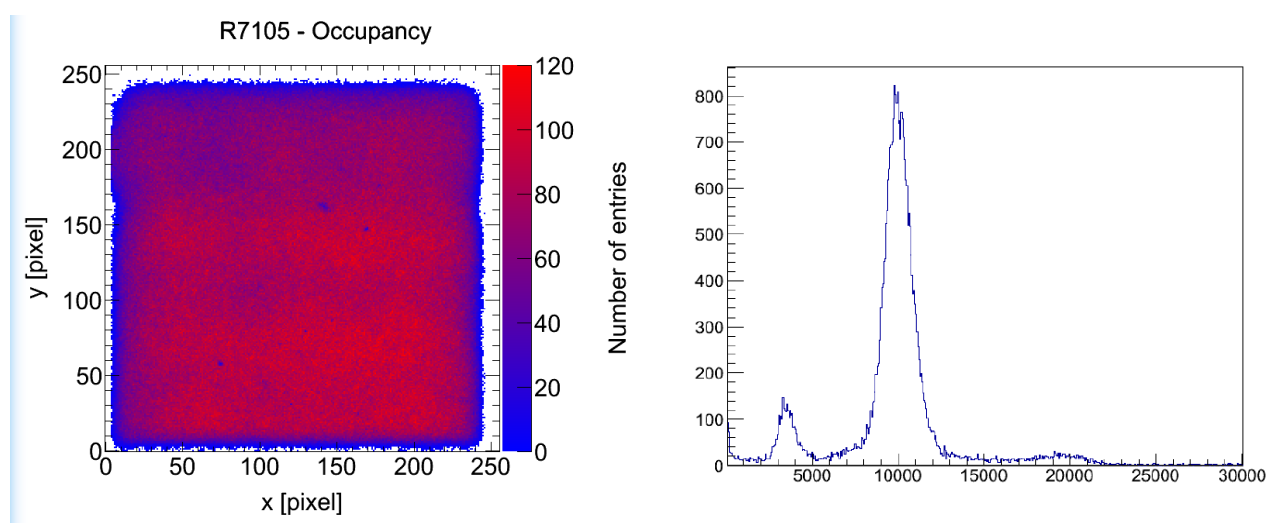


Fig. 1: GridPix E2-W69: left occupancy plot, right: charge spectrum of an X-ray gun with a titanium target

2.) G2-W66: Initial tests show also a good occupancy with very little irregularities and a good energy spectrum. Some region in the lower left corner showed a very noisy behavior throughout all measurements.

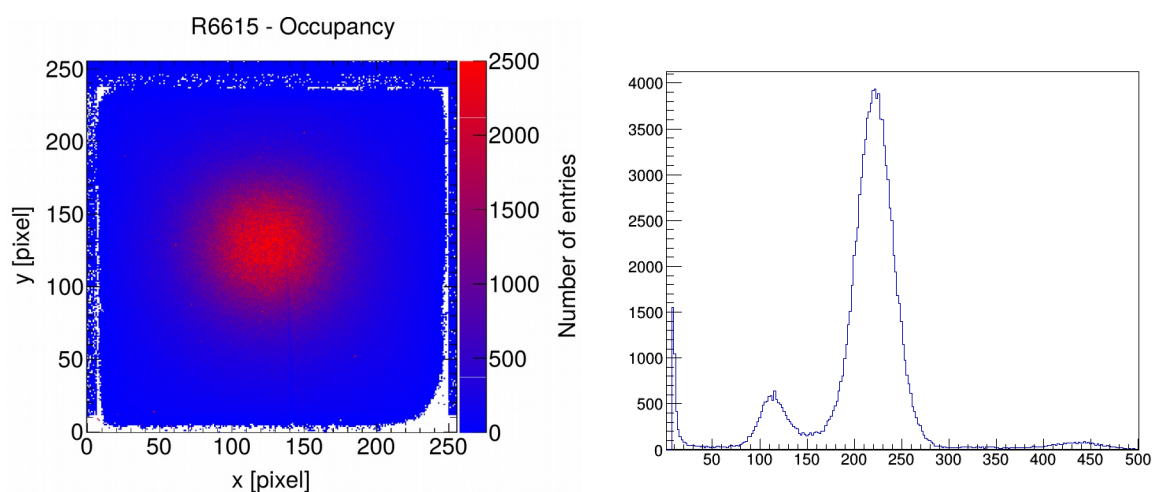


Fig. 2: GridPix G2-W66: left occupancy plot, right: pixel spectrum of an ^{55}Fe -source

After initial tests the voltage has been increased over several days reaching up to voltages of 480 V

(here gas gains could be as large as 500,000?). In the high voltage regime quasi constant sparking occurred with a spark rate of about 1 spark per 20 ms frame. The voltages was kept on for several hours accumulating several 100,000 discharges.

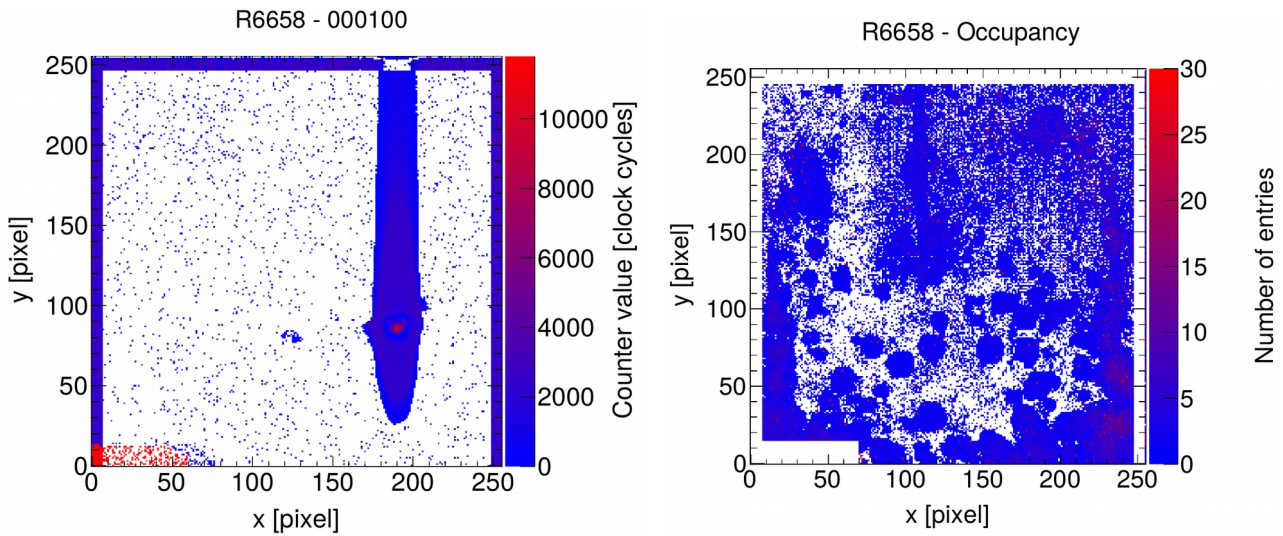


Fig. 3: GridPix G2-W66: left image of a discharge, right: overlay of several sparks with a threshold of 4000 counts.

A raft estimate of the spark centers was done by removing all hits with a charge below 4000 clock cycle counts resulting in the occupancy plot shown in figure 3. It can be assumed, that the discharges occurred over the complete detector, but many were placed close to the dyke in the lower half of the sensitive area.

A third GridPix (E4-W69) is being mounted and will be tested in the course of this week.

These tests give first indications, that we finally have excellent and spark proof GridPixes. Congratulations Yevgen! Congratulations also to our two fresh Bachelor students Markus and Lucian for performing these successful tests.