

X – Ray Measurement: Interesting Anomalies

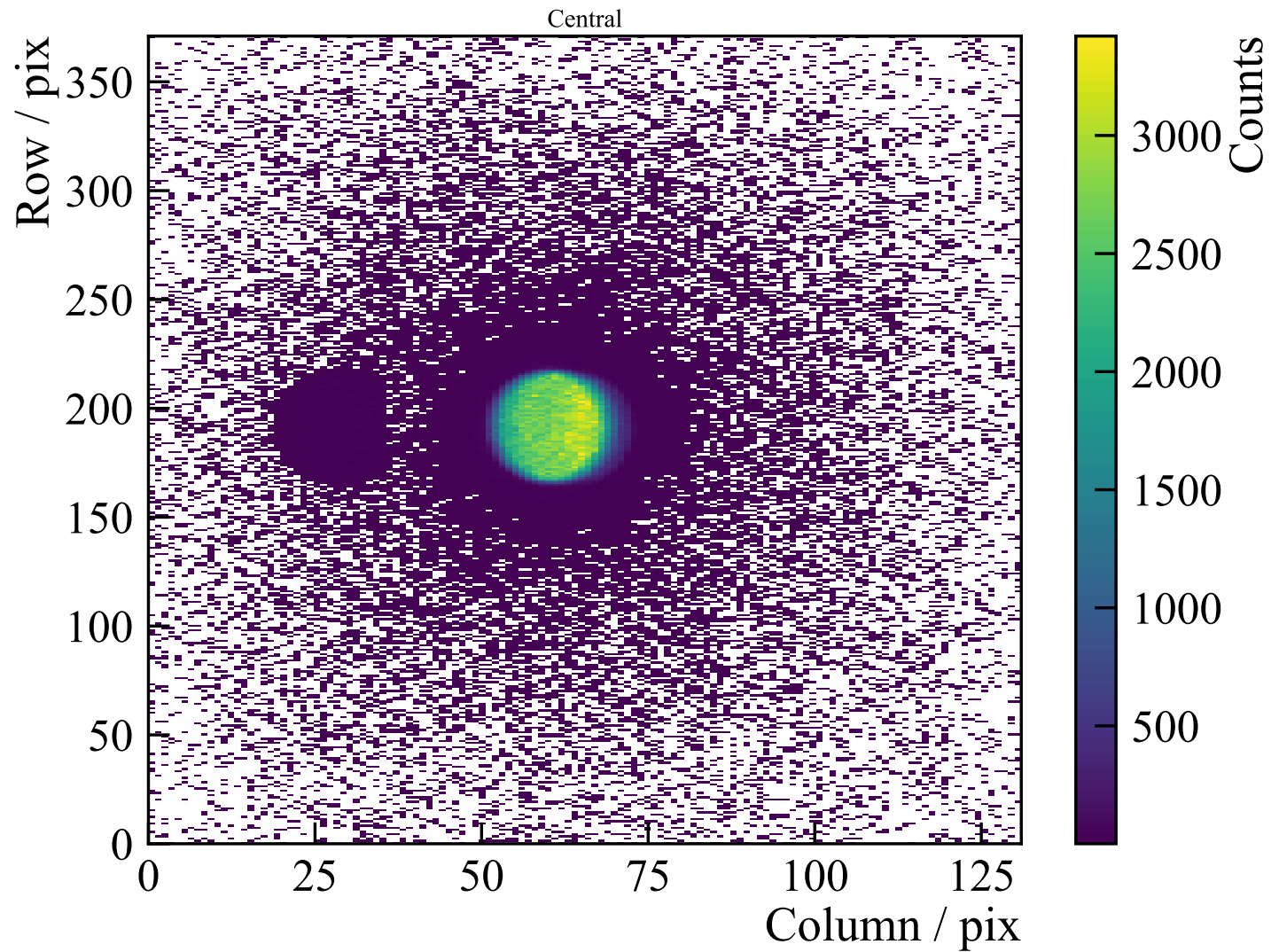
Lucas Dittmann

17.02.2022

Measurement Setup

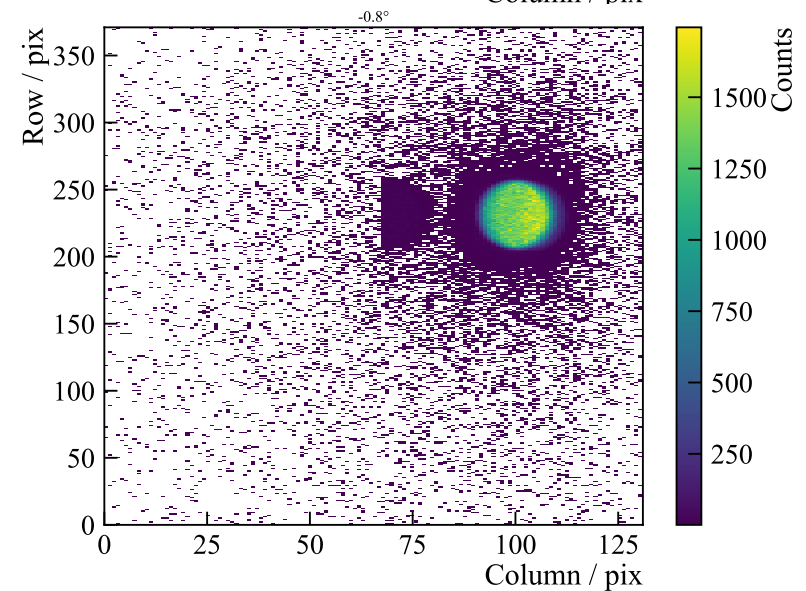
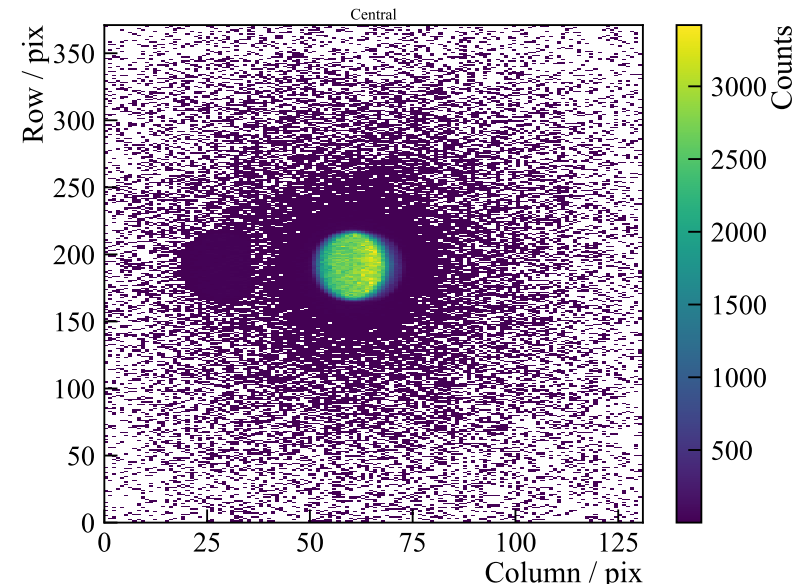
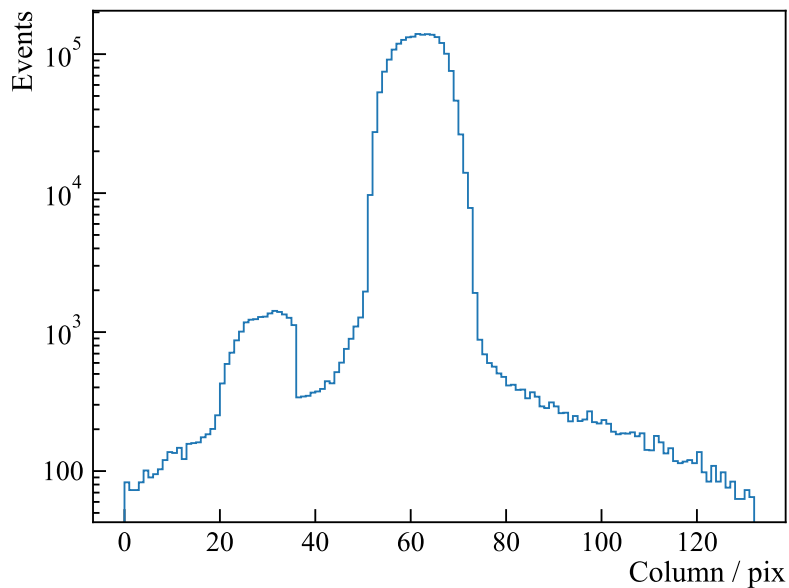
- Tungsten / Molybdenum Anodes
- $V_{\text{Tube}} = 35 \text{ kV}$, $I_{\text{min}} = 0.01 \text{ mA}$
- Collimator = 2 mm
- Threshold = 165 DAC, TDAC = 4 (untrimmed), VNDAC = 0, HV = -60 V
- External Clock 160 MHz → 320 Mbit/s Readout

Beam Halo

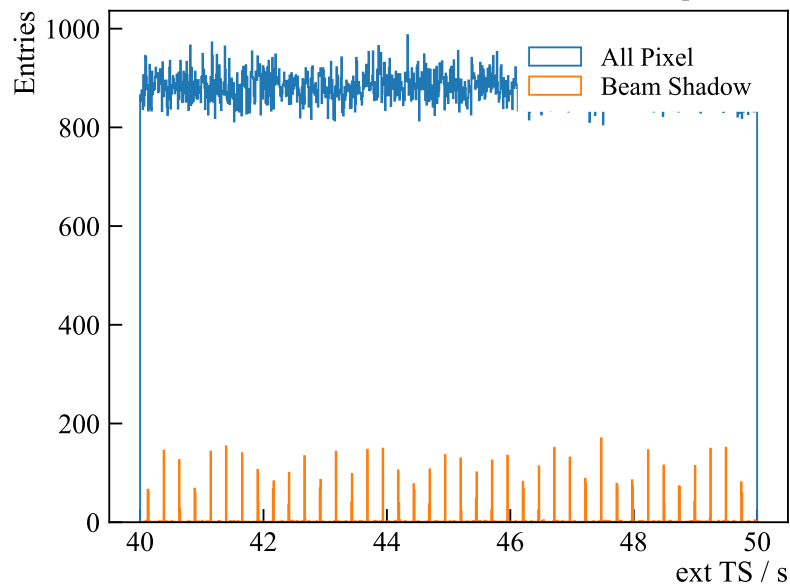
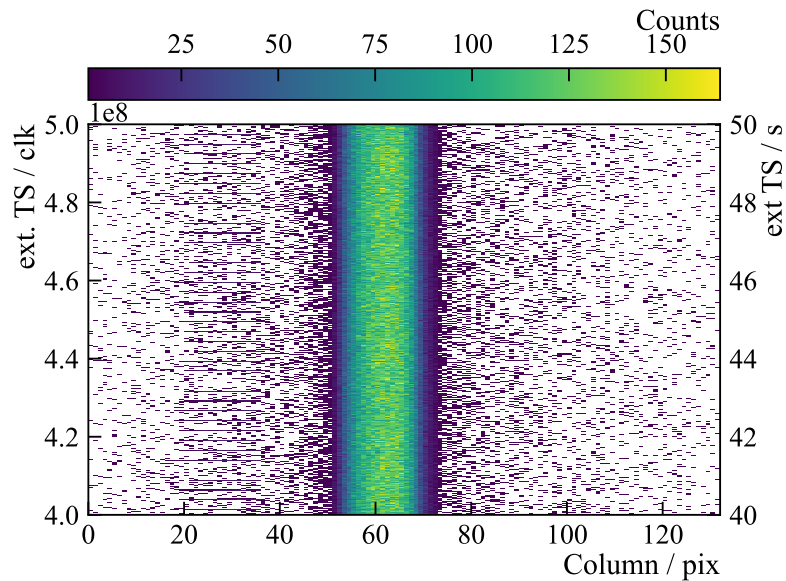


Beam Halo - Position

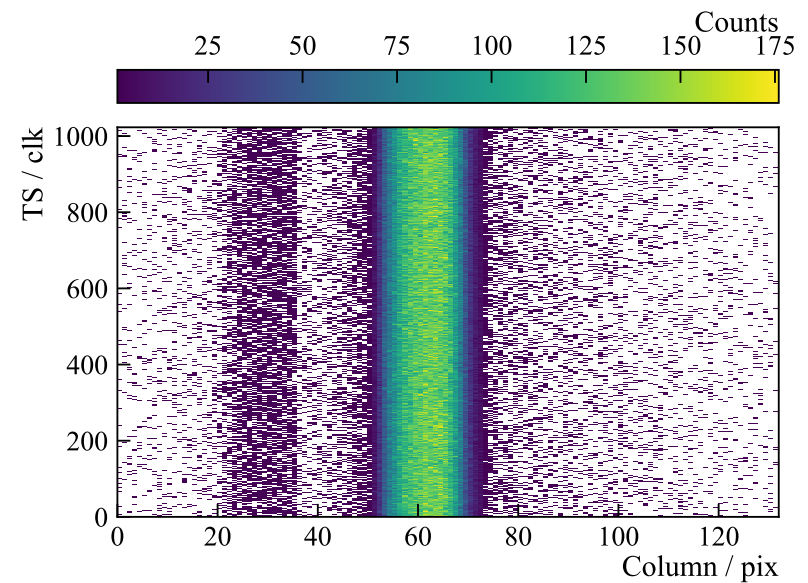
- In every X-ray measurement
- Already at min. rate
- Always ~ 20 cols from beam spot
- No angle dependency
- Sometimes hard cut in column



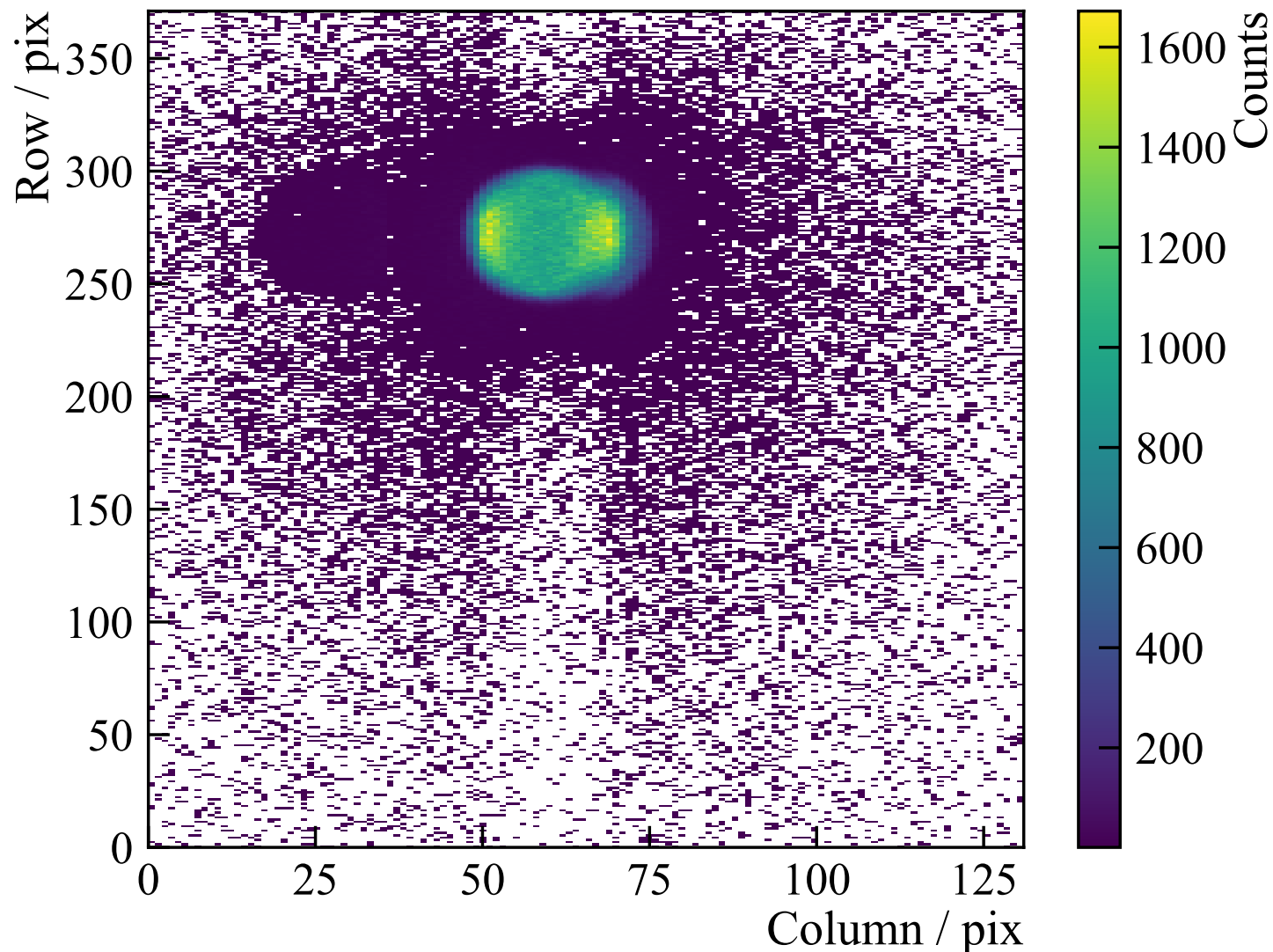
Beam Halo – Time Dependency



- Time dependent with $f \approx 8$ Hz
- No dependency on TS 1 / TS2 / ToT

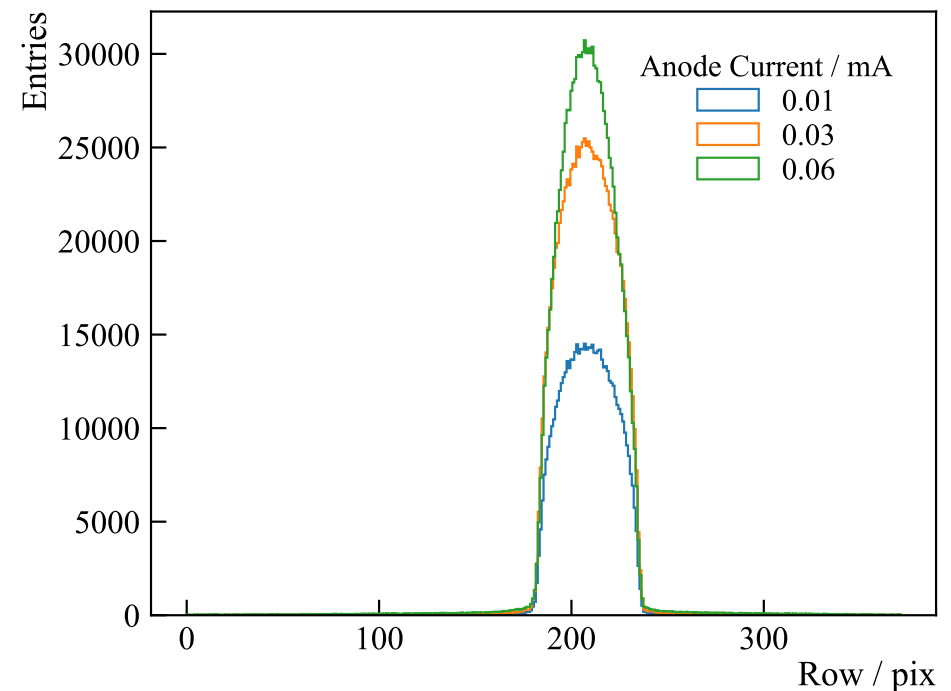
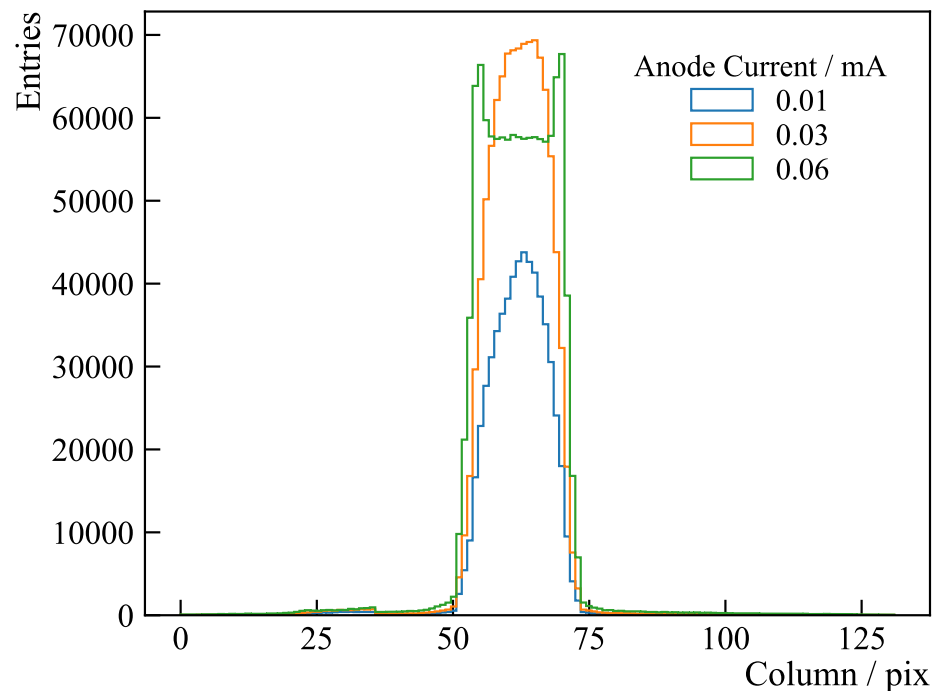


Decreased Activity in Beam Spot at higher Rates

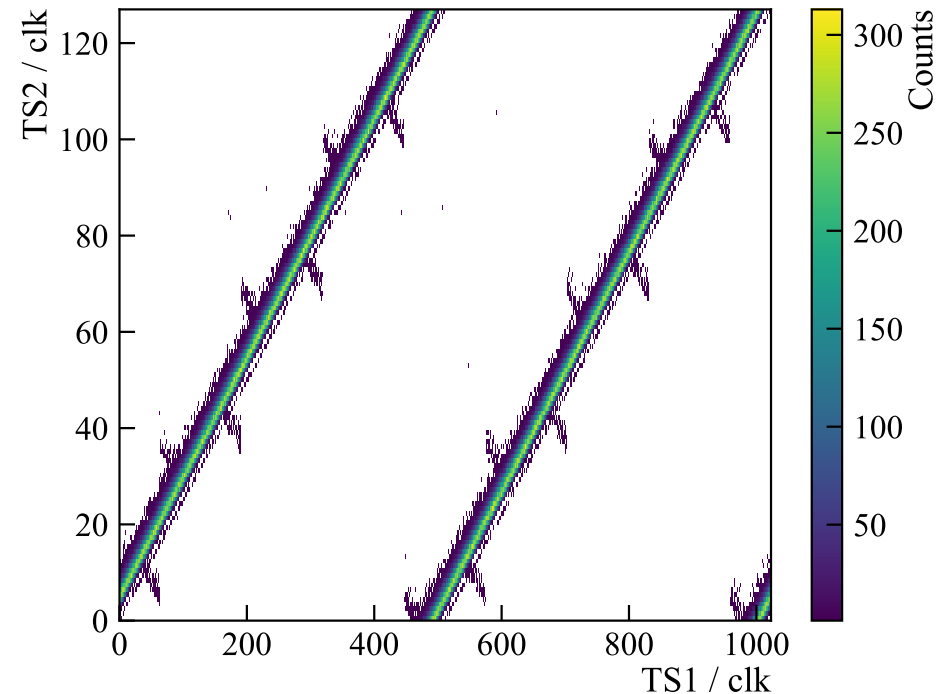
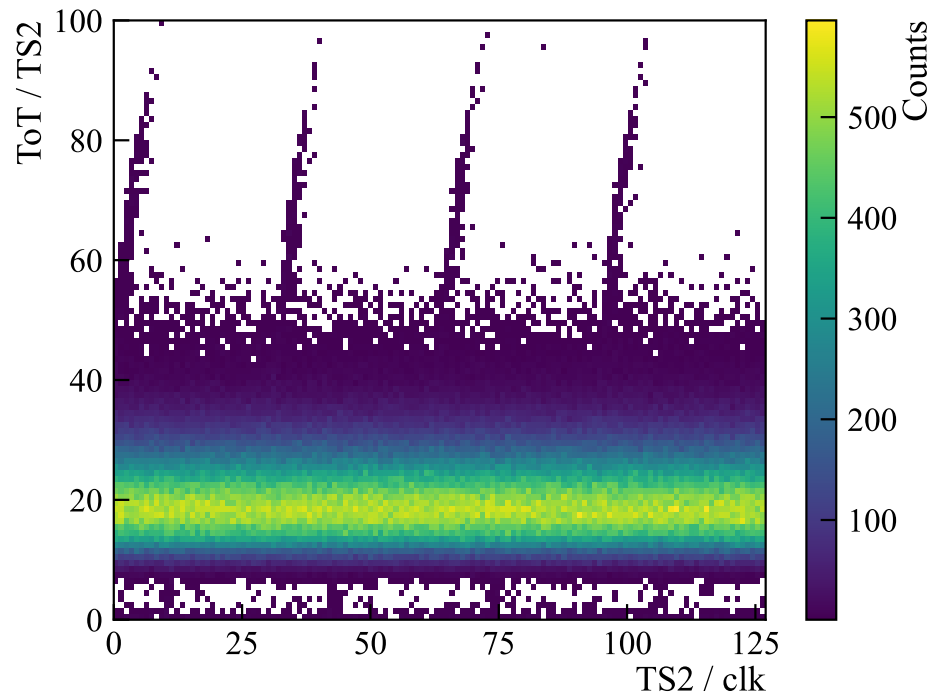


Decreased Activity in Beam Spot at higher Rates

- Whole columns with less activity
- Only at higher rates: $I_{\text{Xray}} > 0.03 \text{ mA}$ (2 mm collimator)

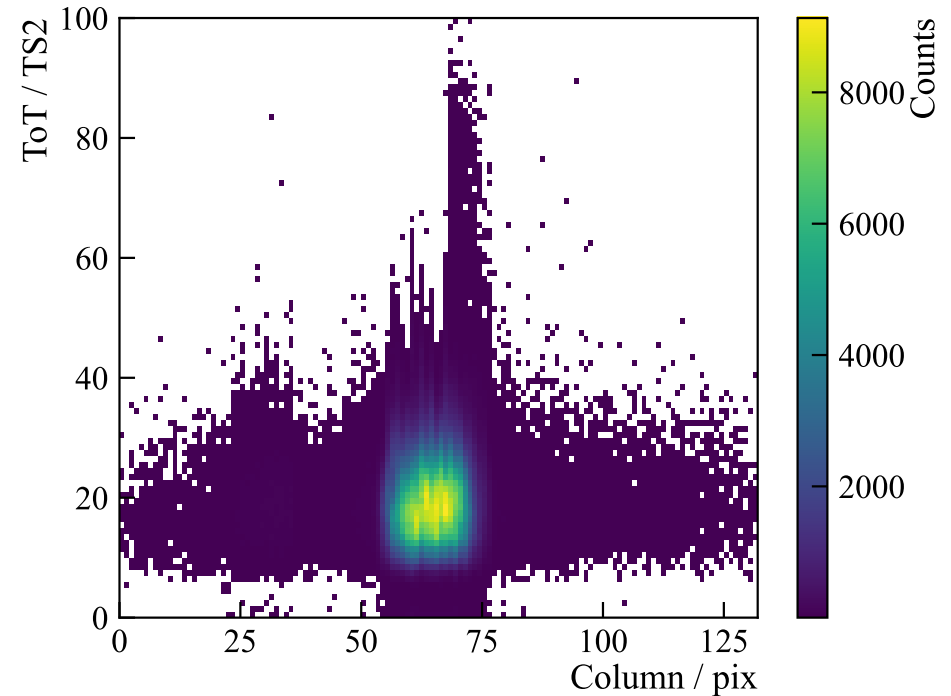
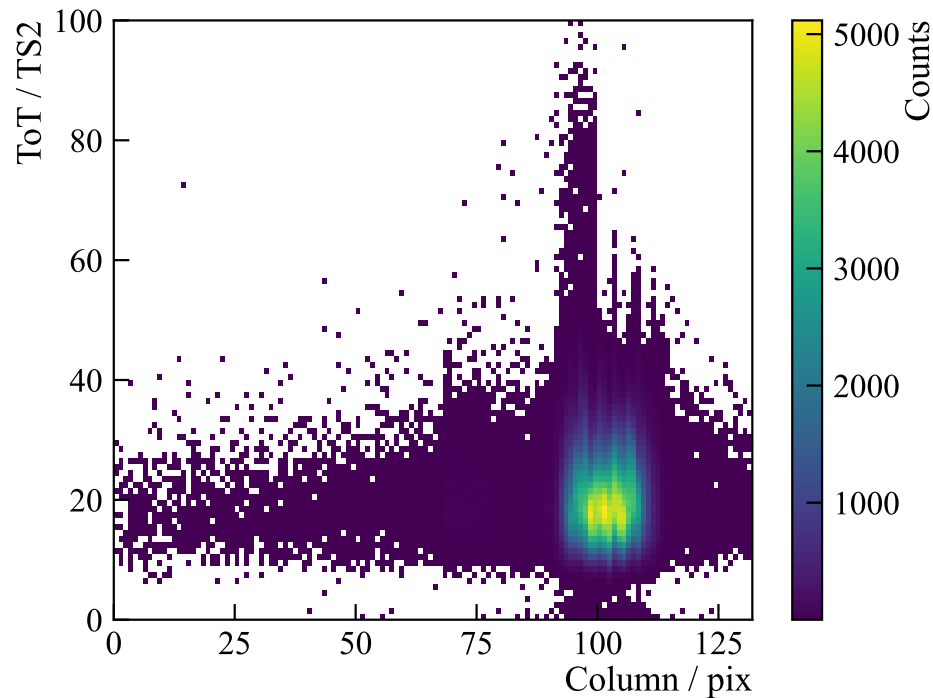


Timestamp Wings – Time Dependency



- Almost in all measurements
- Higher ToT at 4 specific TS2
- Lower ToT at 4 specific TS2
- Normal TS1 & TS2 distribution

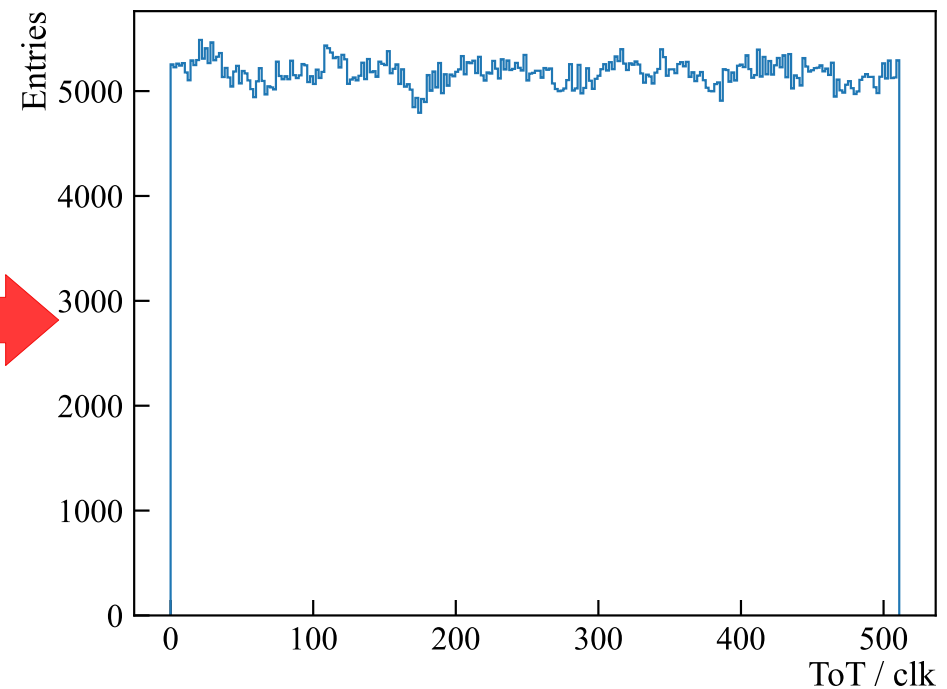
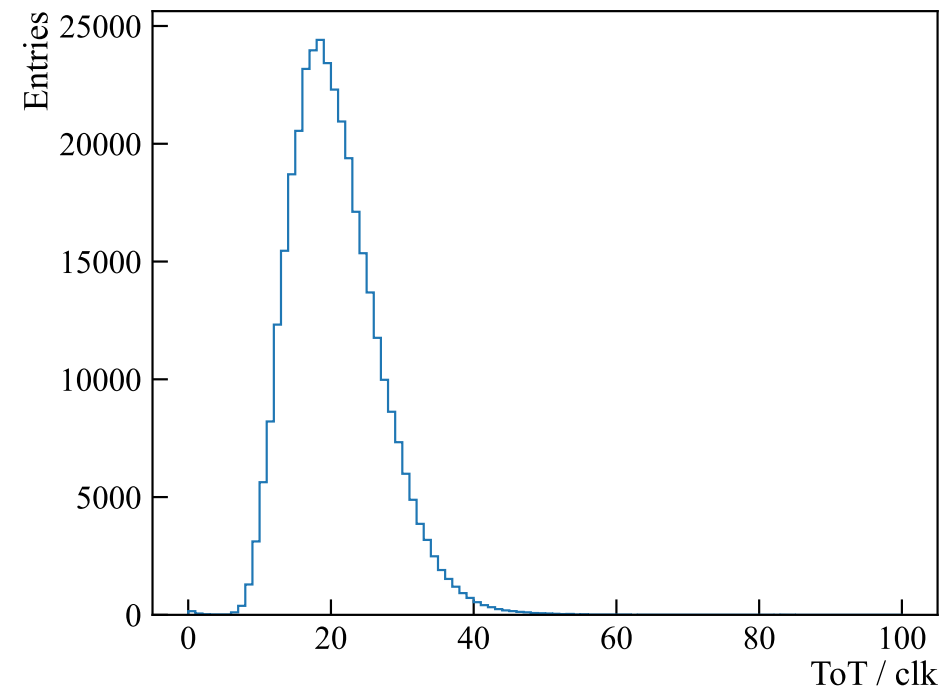
Timestamp Wings – Spatial Dependency



- Always next to beam spot
- Hard cut on one side

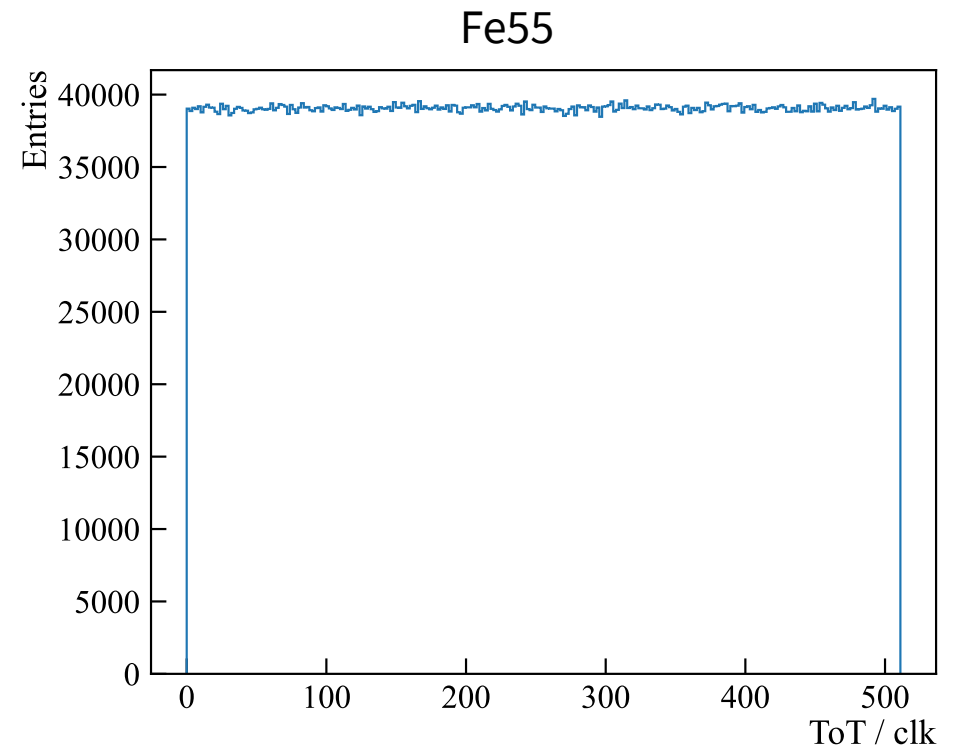
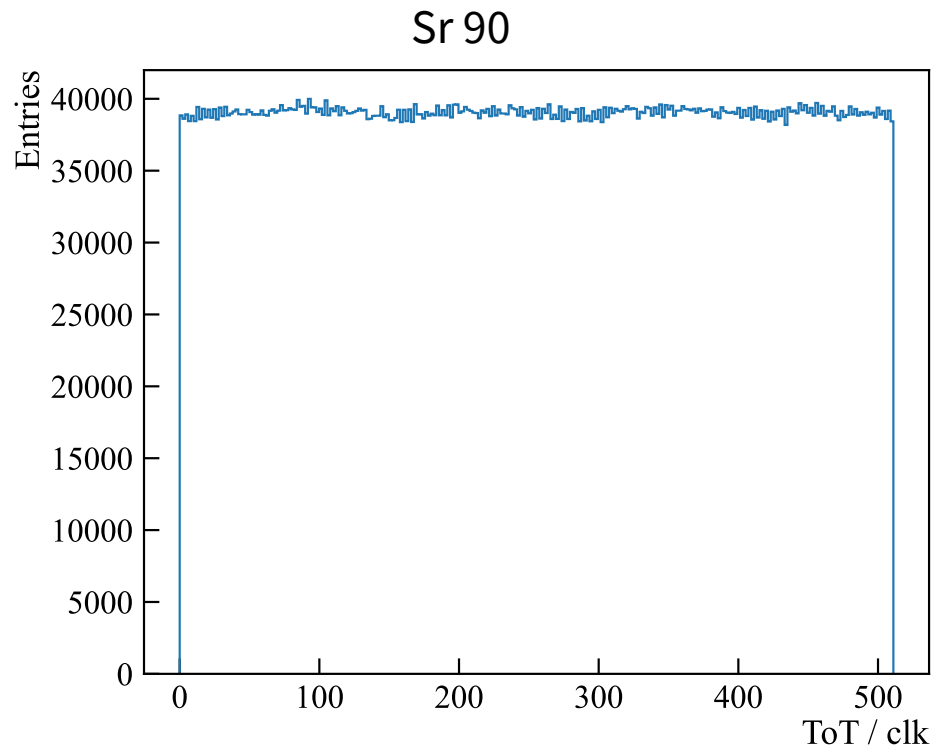
Loss of ToT Information

- Nothings strange in other parameters
- Not reproducible yet
- Sadly: Don't know X-Ray Tube Settings



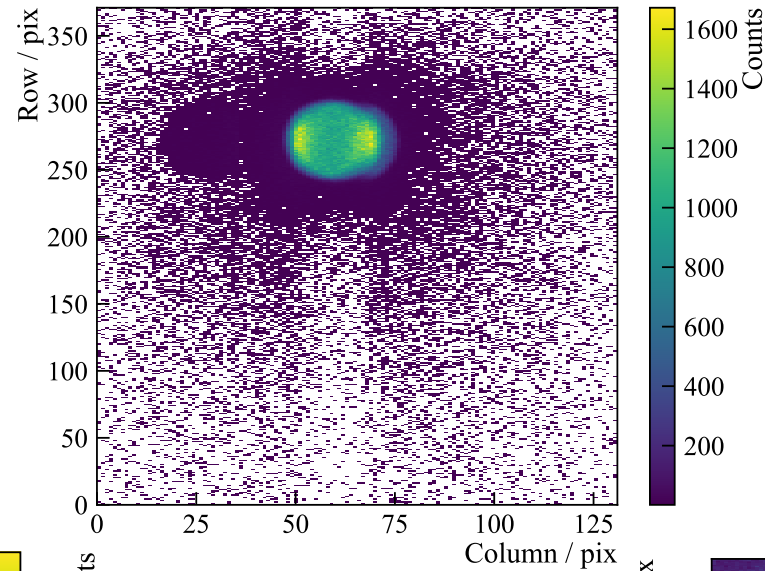
Loss of ToT Information

- But: Happend with Fe55 and Sr90
- ???

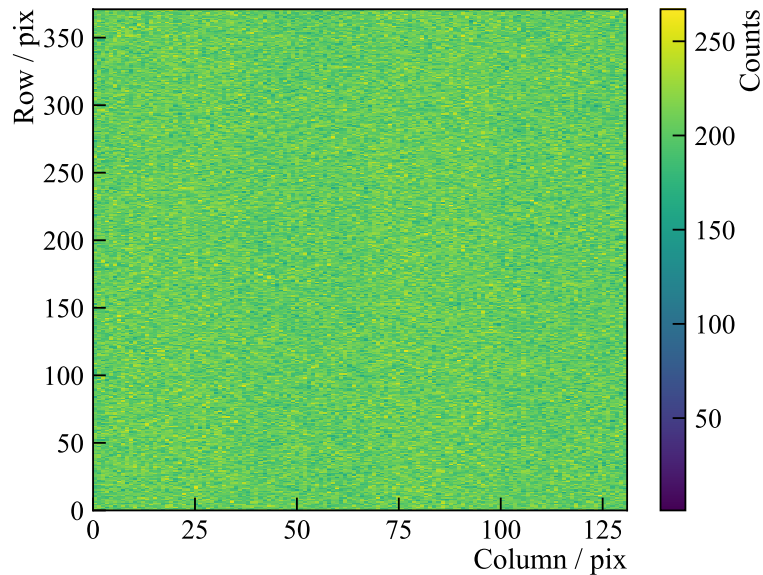


Loss of ToT Information - Hitmaps

W - X-Ray



Fe55



Sr90

