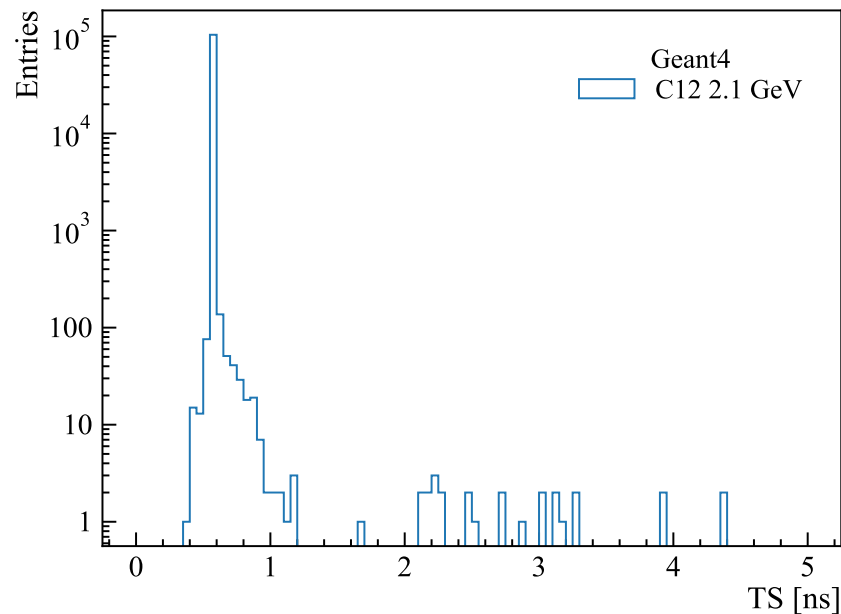


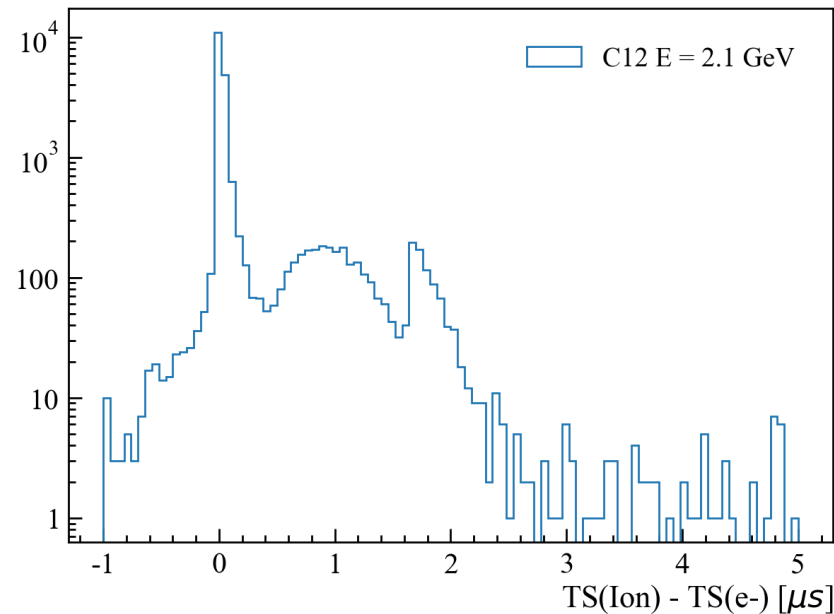
Update HIT Beam Analysis/Simulation

Previously: Time Structure

- Time after primary particle production (20 cm in front of sensor)
- Data: Timewalk + missing data?



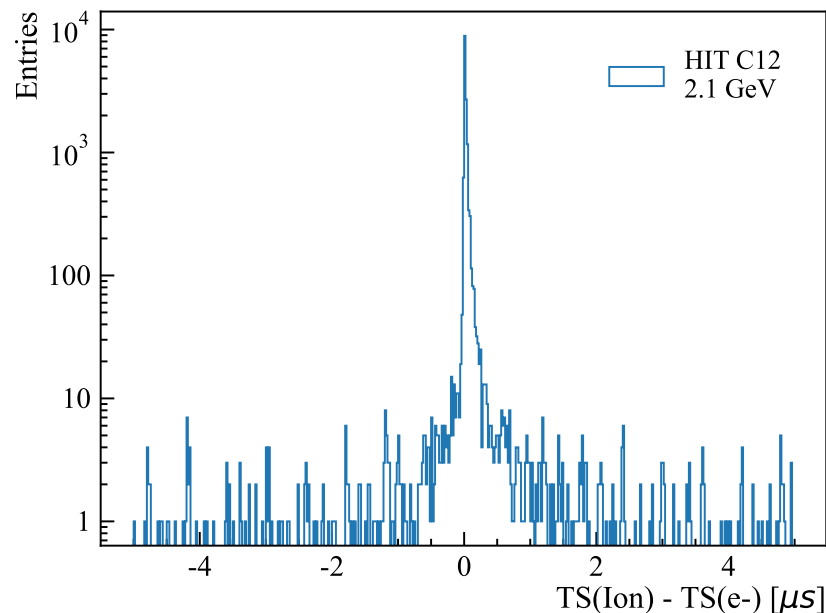
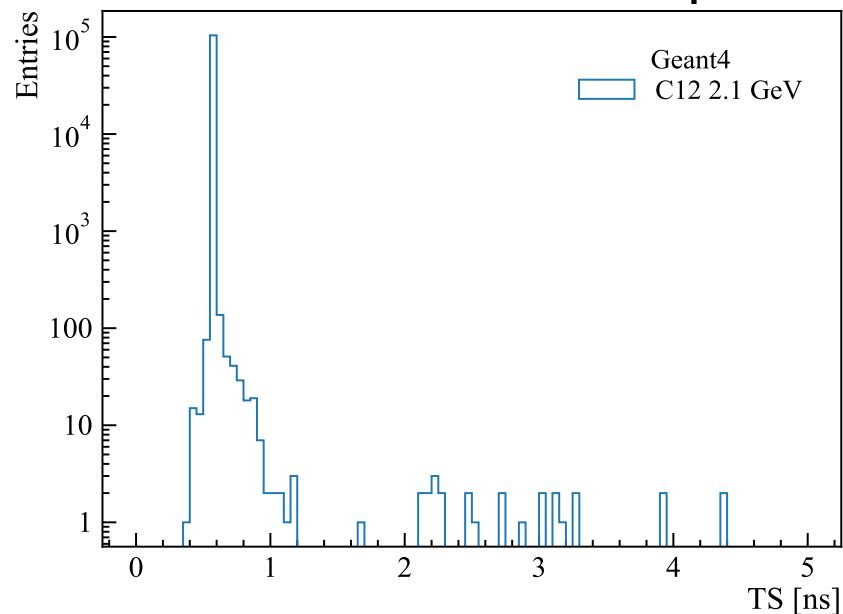
Lucas Dittmann



Time Structure

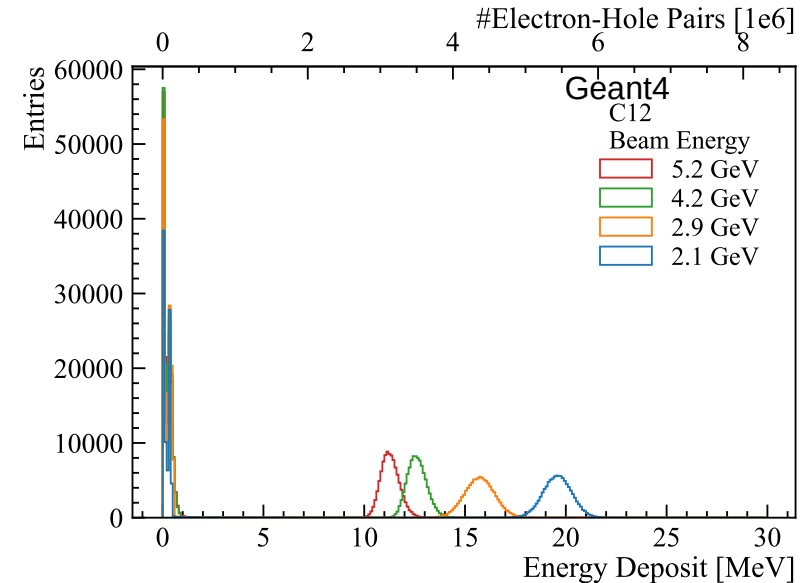
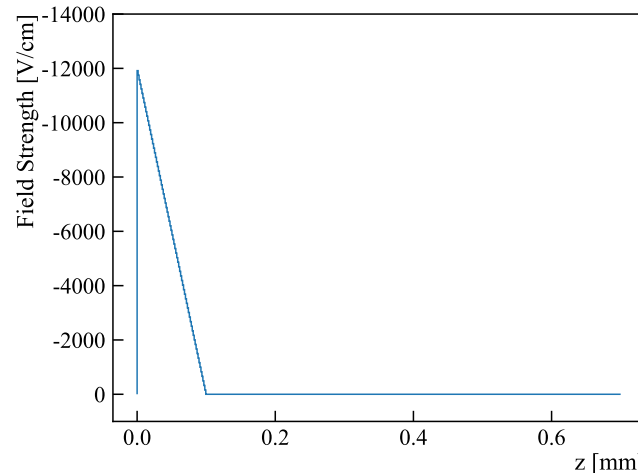
- Bug in cluster algorithm (ordering of operations)
- See time resolution in data $\rightarrow \sigma = 12$ ns

→ Time structures are compatible



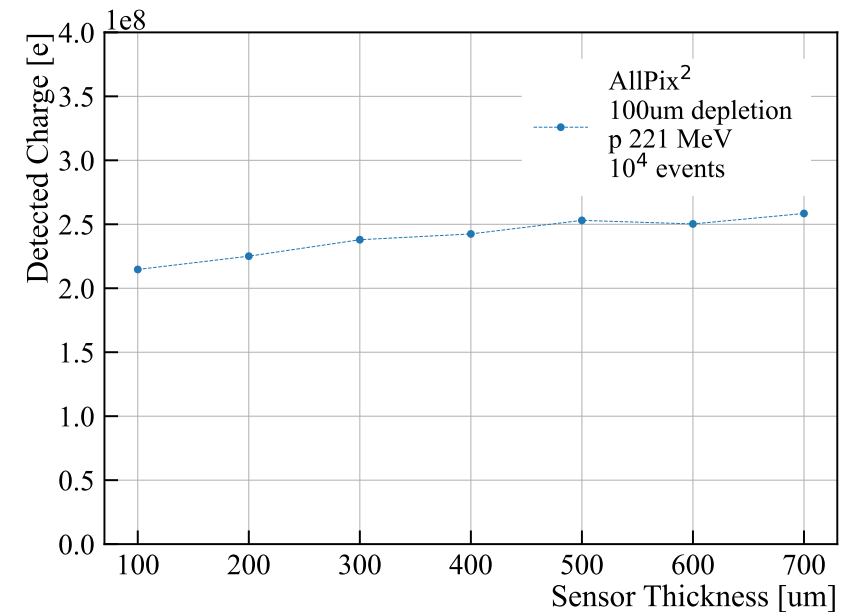
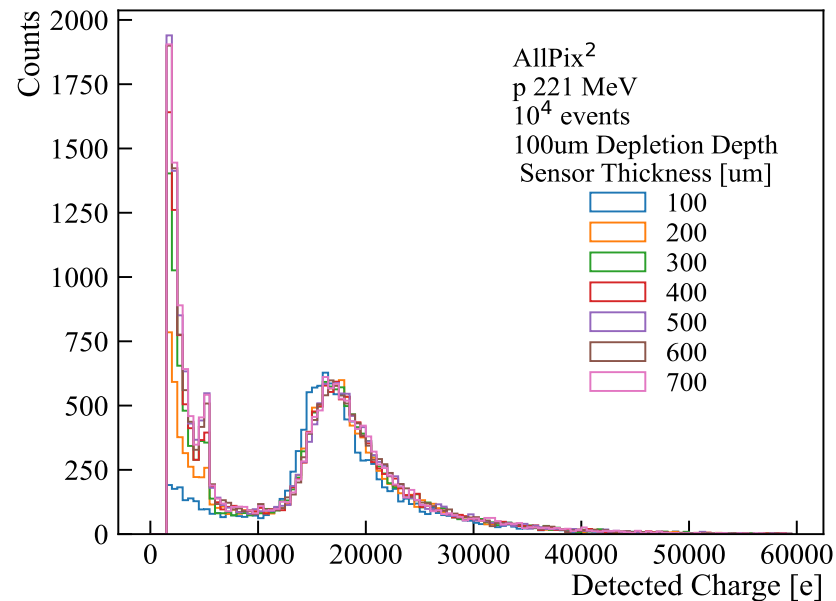
AllPix²

- Motivation: Find out what happens to 5×10^6 e-h pairs in 700μm Si
- Used almost the same physics model as in Geant4
- Linear depletion model with 100 μm depletion zone
- ProjectionPropagation (time cut = 5μs)
- DefaultDigitizer



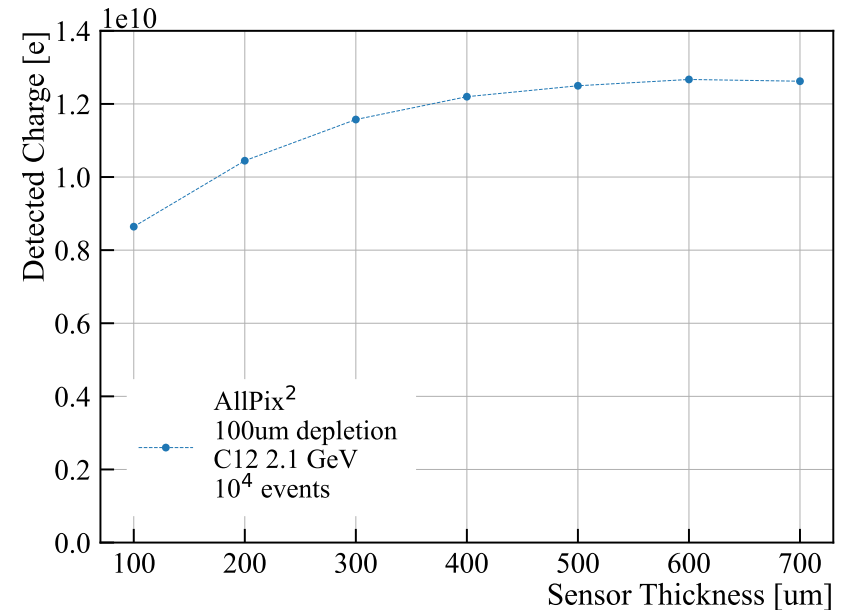
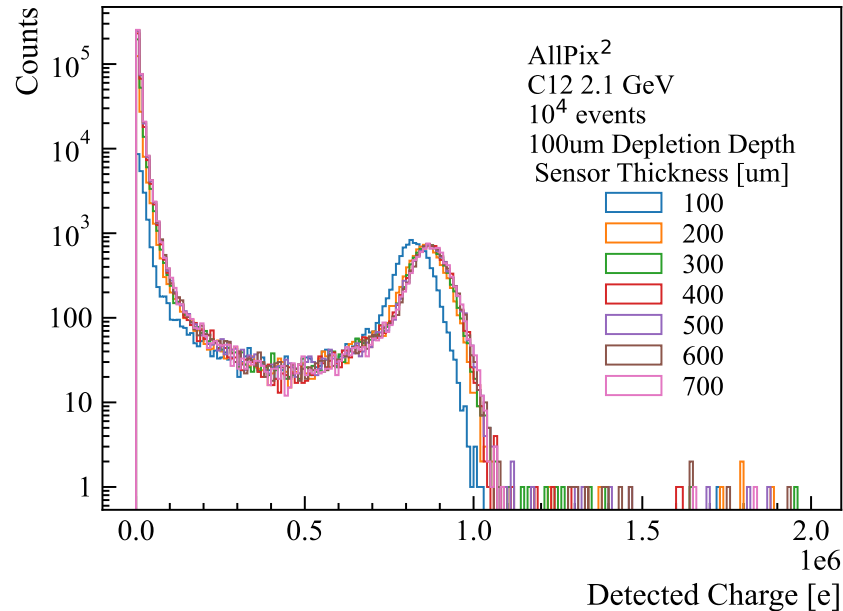
AllPix² – Sensor Thickness – Protons

- Detected charge = charge in pixel
- Number of low pulses increases with sensor thickness
- Large signals get slightly larger and do not increase after $z > 200 \mu\text{m}$



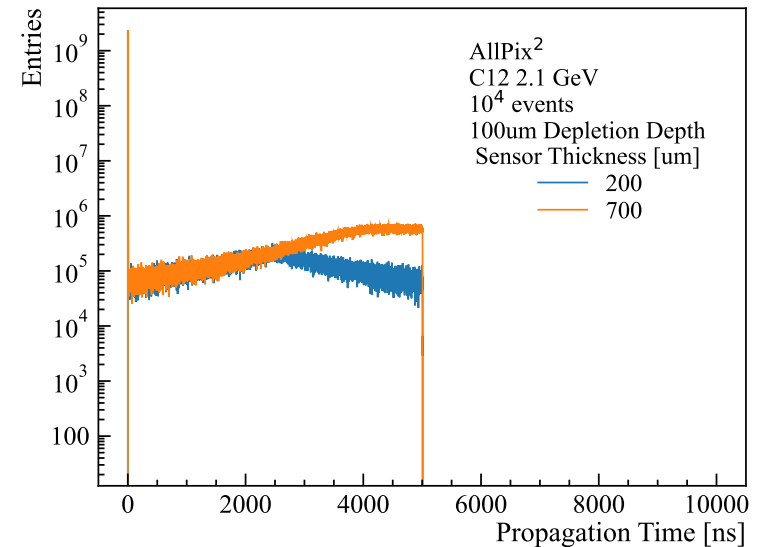
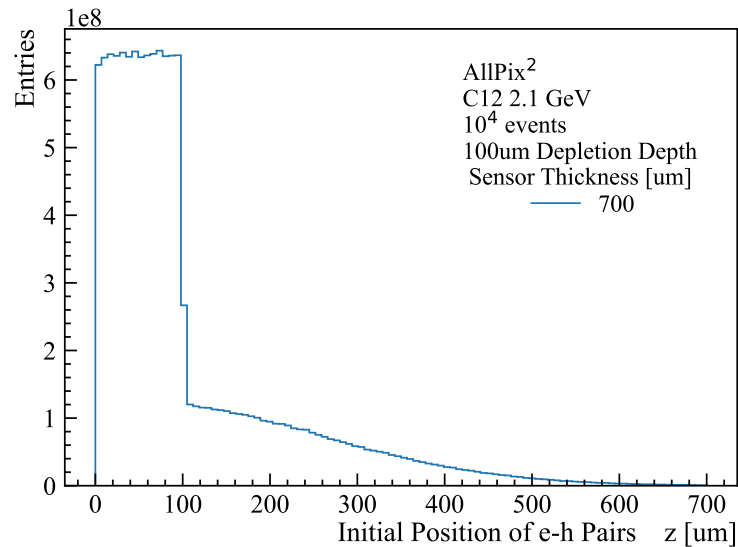
AllPix² – Sensor Thickness – C12

- 5×10^6 e-h pairs created by C12 in 700 μm Si
- Lose about 4×10^6 e-h pairs



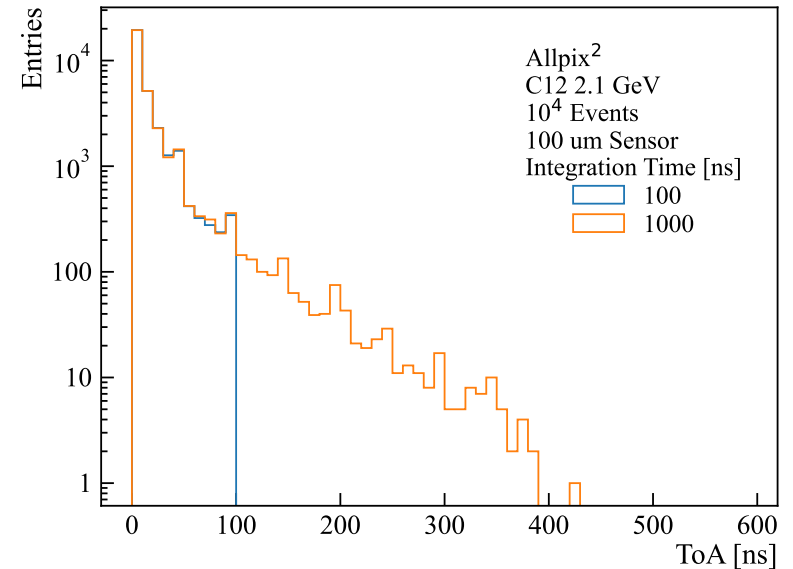
AllPix² – Diffusion

- Very long signals; propagation cut at 5 μs
- Data: Max. time extend of cluster $\Delta t = 2 \mu\text{s}$



AllPix² – CSA Digitizer

- Previously: Recorded integrated signal
- Now: Find out how many diffusion charges are detected
- Use CSA Digitizer
- But: What Integration Time?
 - Set limit on integration time & ToA!



AllPix² – Integration Time vs Amplitude

- 100 μm Sensor, completely depleted (reduce computing time)
- 5 μs cut on propagation

