

TimeSPOT WP4: Stato delle attività a Milano

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- **High level simulations** of the algorithm performed, with VELO-like detector in LHCb Upgrade II conditions and 30 ps timing resolution
- **Hardware architecture** defined and implemented
 - Full stub constructor to be finalized
 - Full tests with VC709 + gFEX communication pending
- **Simulation of the algorithm** with data from LHCb VELO Upgrade I ongoing
 - **Data quality** improved with respect to previous simulation based on “toys”
 - **Better correspondence** between hardware and software algorithm implementation
 - Integration of **timing and Upgrade II** conditions almost transparent

- **Standalone** simulation written using **Python 3**:
 - LHCb VELO data (hits and particles) imported from **ROOT file**
 - **Data handling** and processing mainly based on **Pandas**
- The **software simulation** is needed to properly “train” the hardware system:
 - Evaluate **the hits distribution** on different sensor planes
 - Evaluate **the regions of interest** for searching the **stubs** on sensor couples
 - Evaluate **the distributions of Engines** in the reference plane (in particular the radial distribution)
 - **Prepare the data** to be fed to the hardware device via PCIe

- **Software plans:**

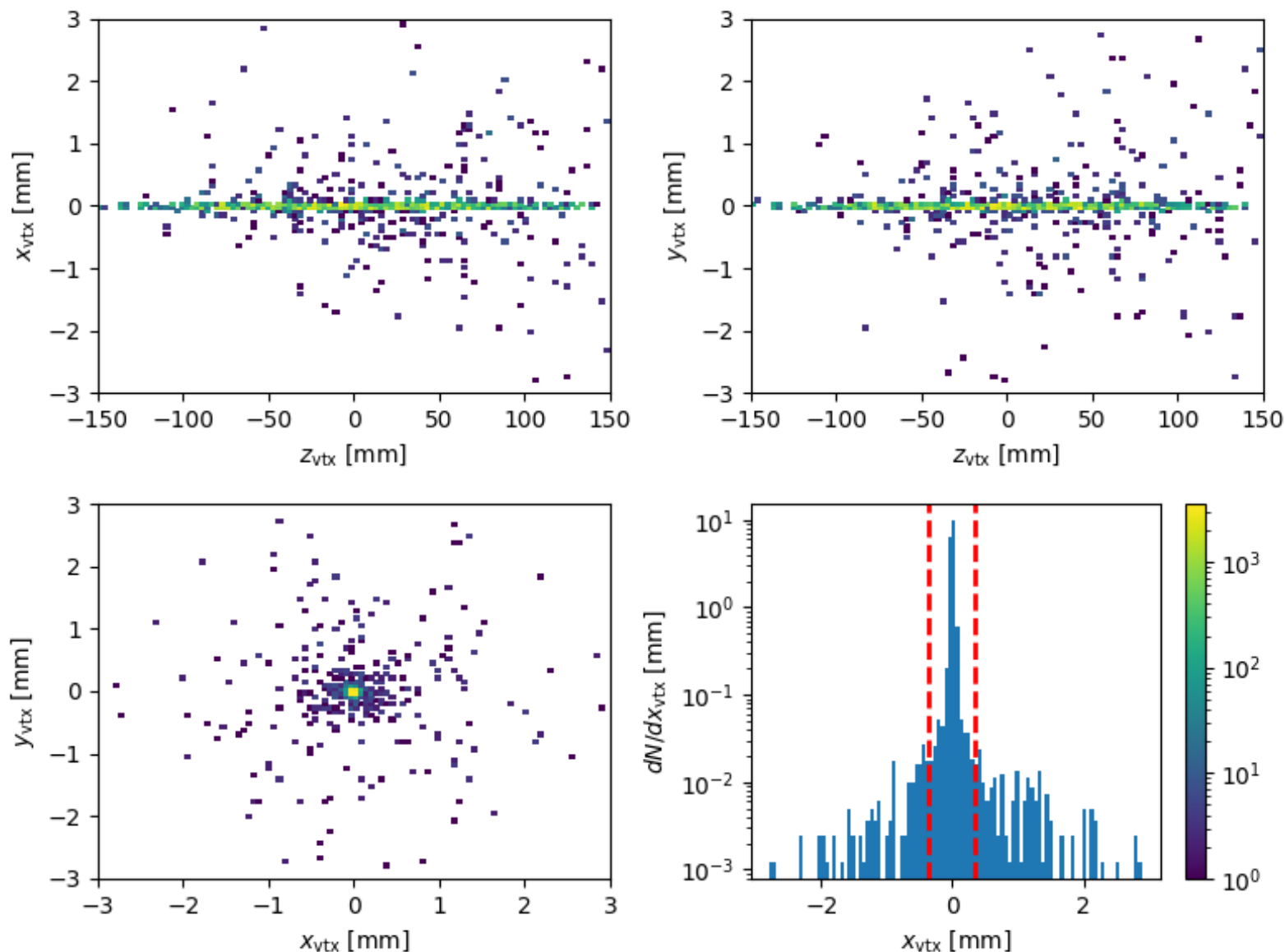
- **The software porting reproduces the results** obtained from previous high-level simulations based on “toys”
- Data from Upgrade-II simulations with **timing will be included**
- The **Engine** (last part of the processing chain) has been **implemented in software**
- Evaluation of the **performances** ongoing

- **Hardware tests plans:**

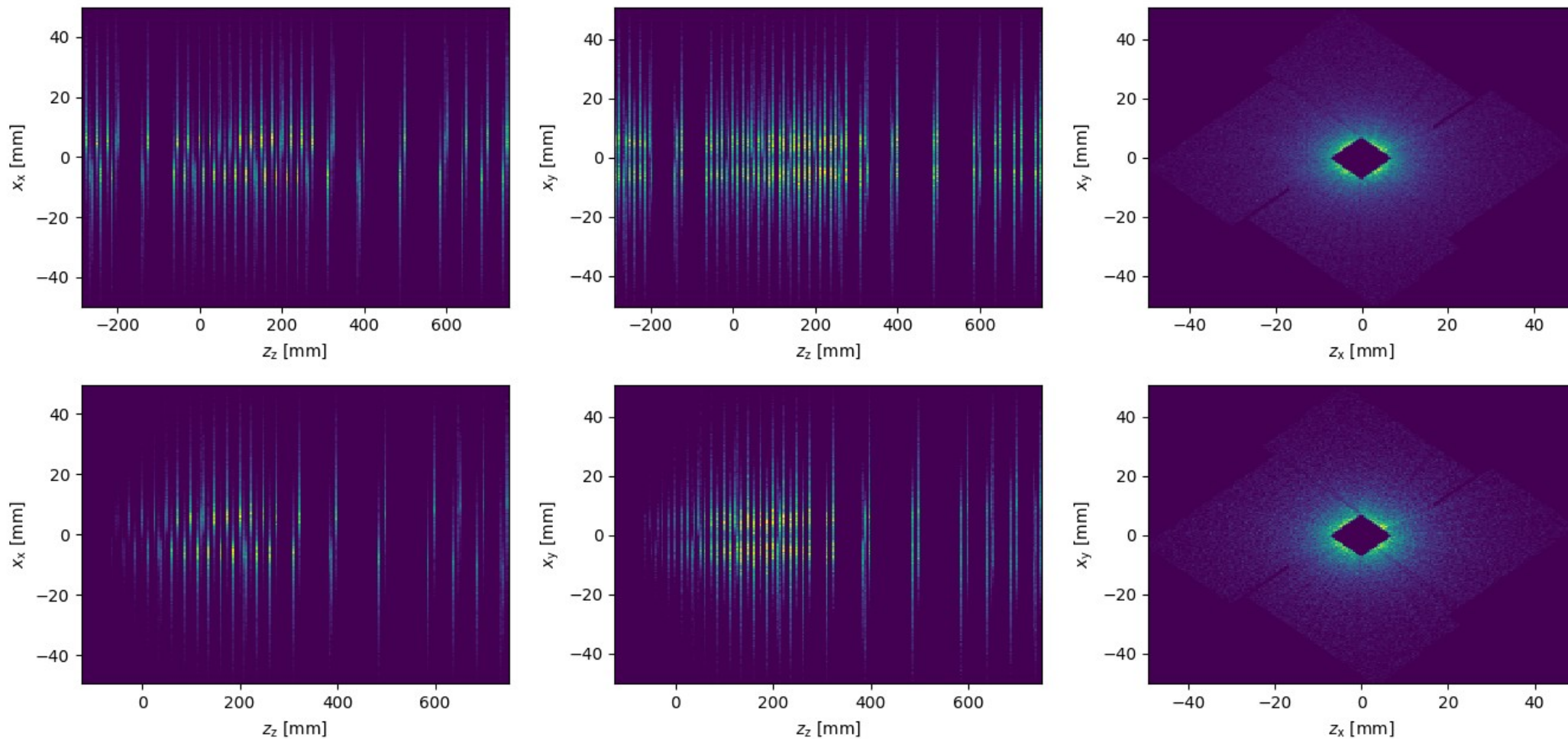
- **Reproduce the Switch+Engine** on a sector of the LHCb VELO using improved data
- **Test the Stub Constructor** on the VC709 board
- Test the full system

BACKUP

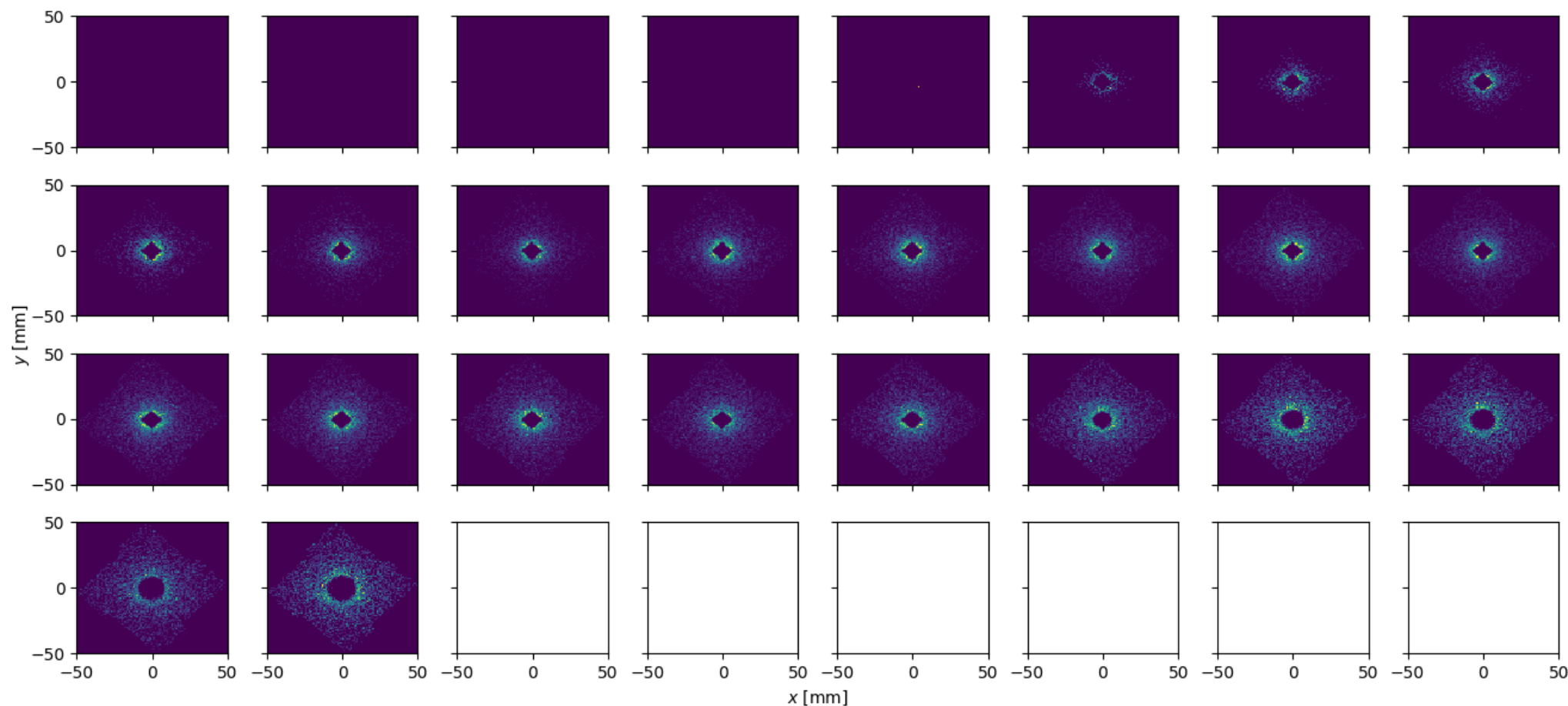
Vertex distribution



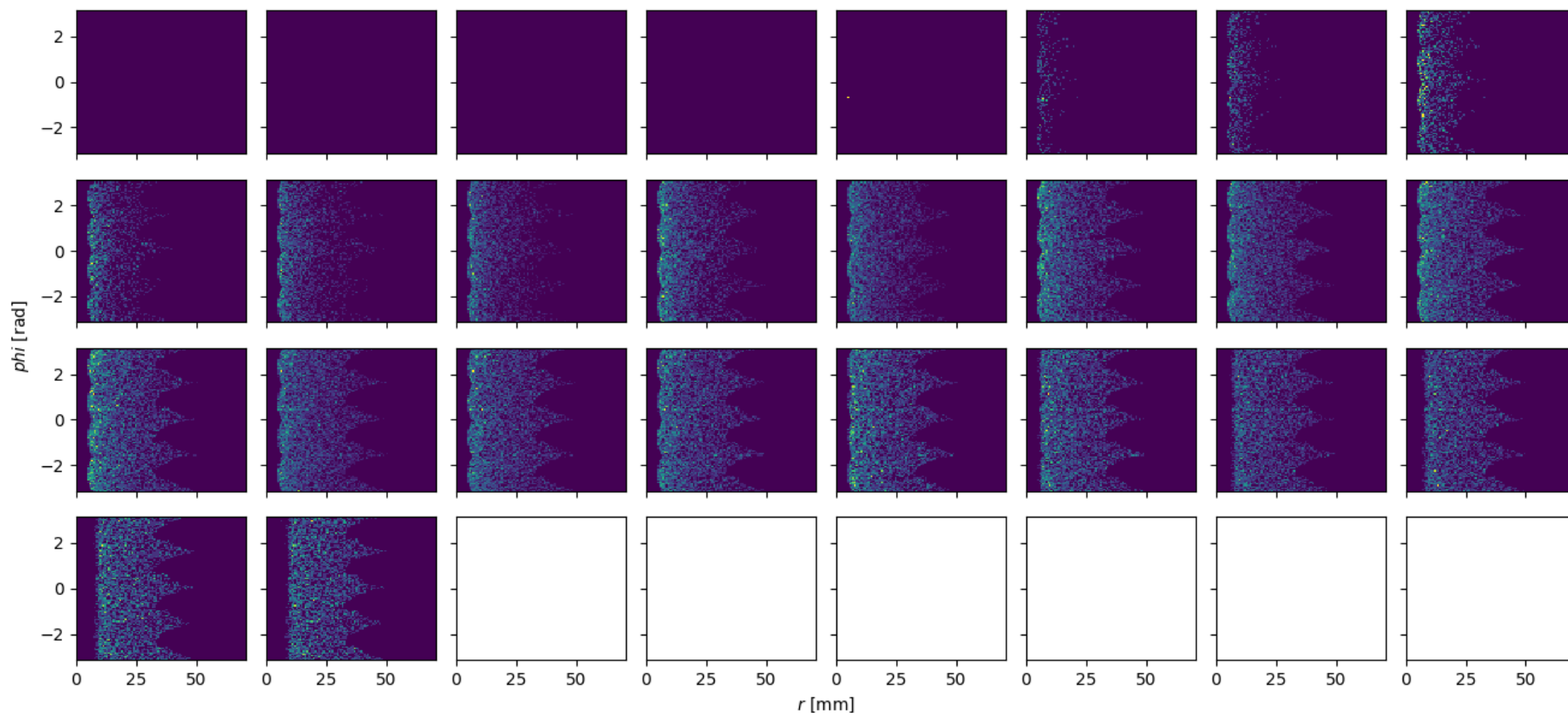
Hits from all the particles



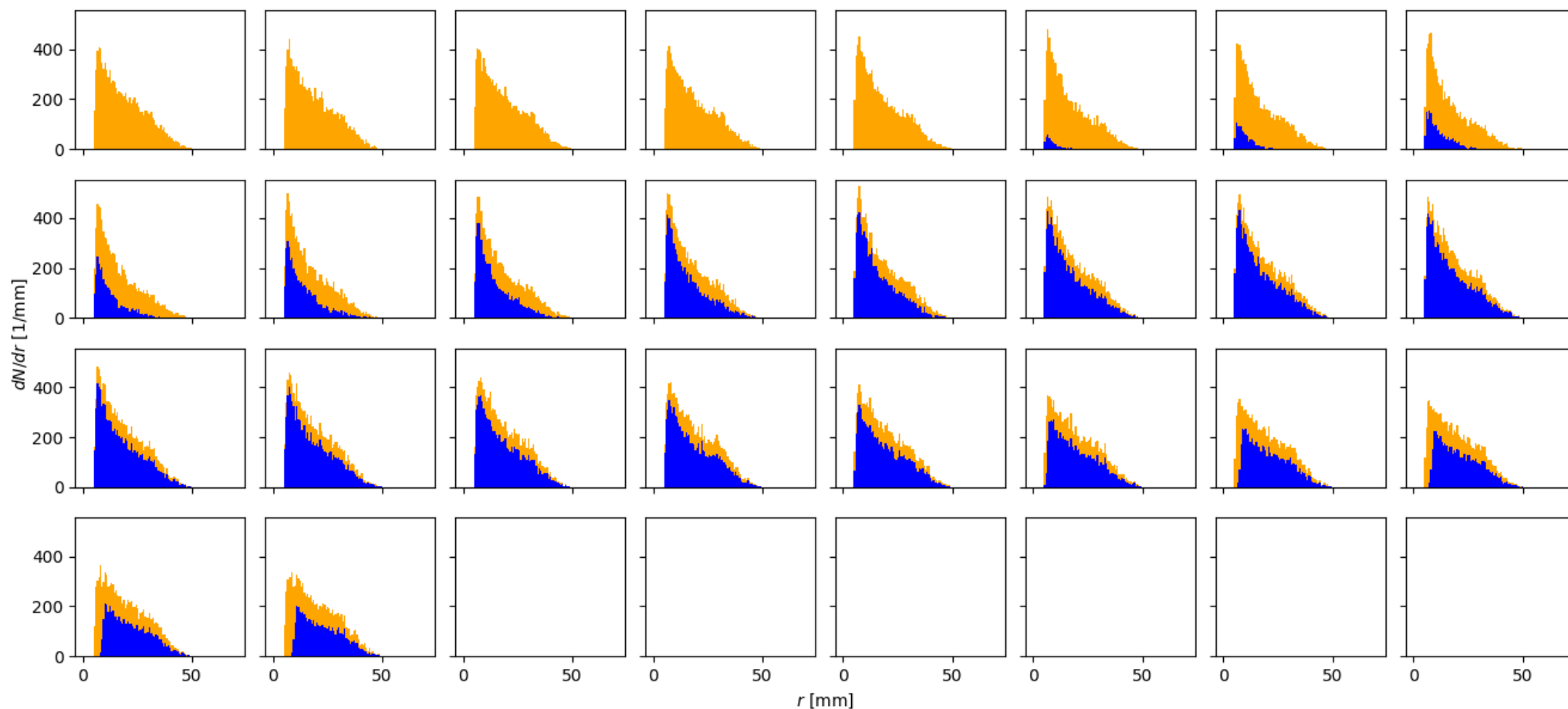
Hits from "trackable" particles



Hits from “trackable” particles



Hits from “trackable” particles



Orange: Hits from all particles
Blue: Hits from "trackable" particles

