

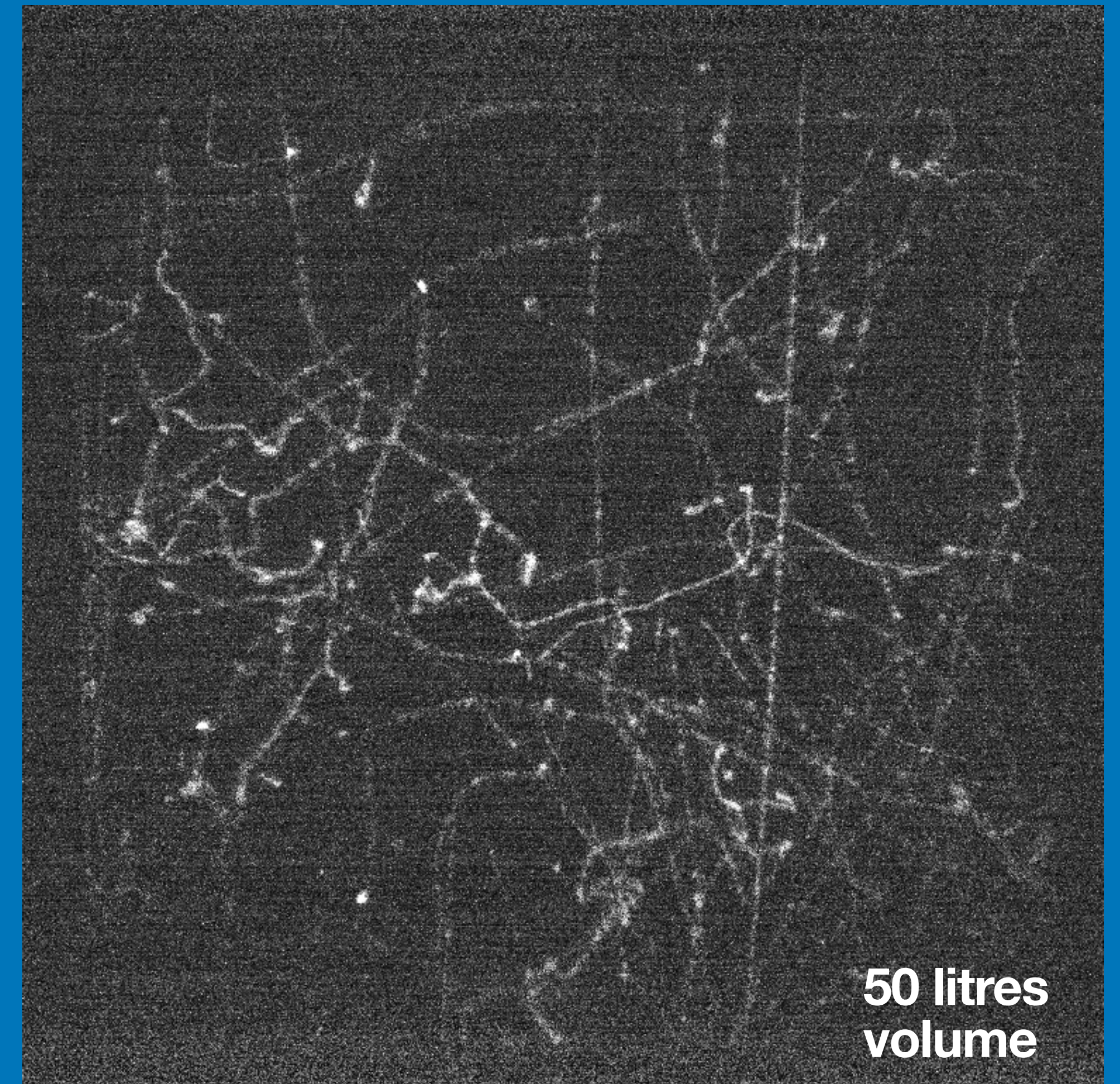


TPC based on GEM with Optical Readout

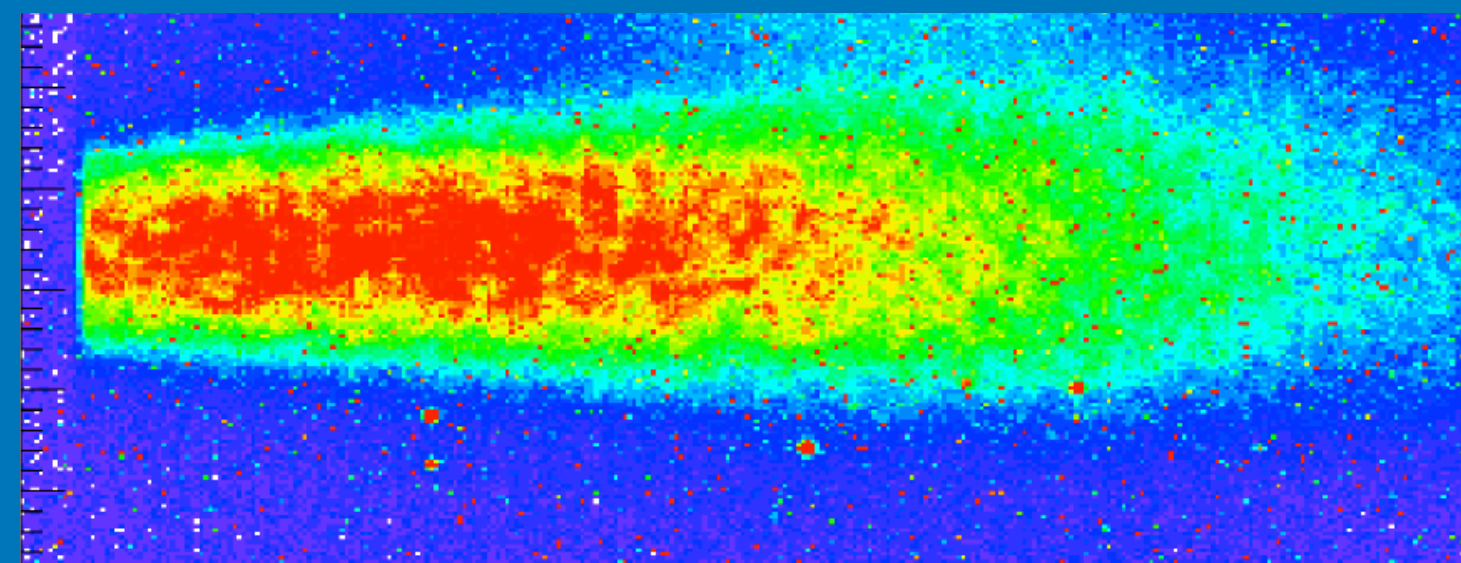
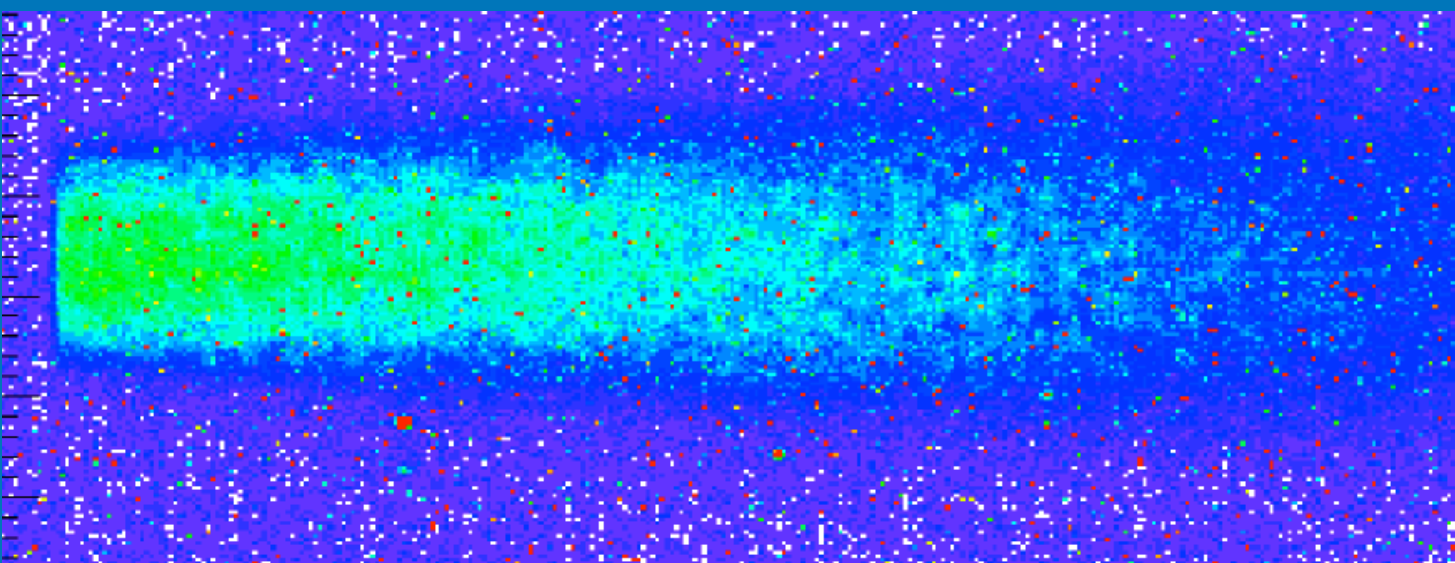
- RM1, LNF, RM3, LNGS

Challenges and New Developments

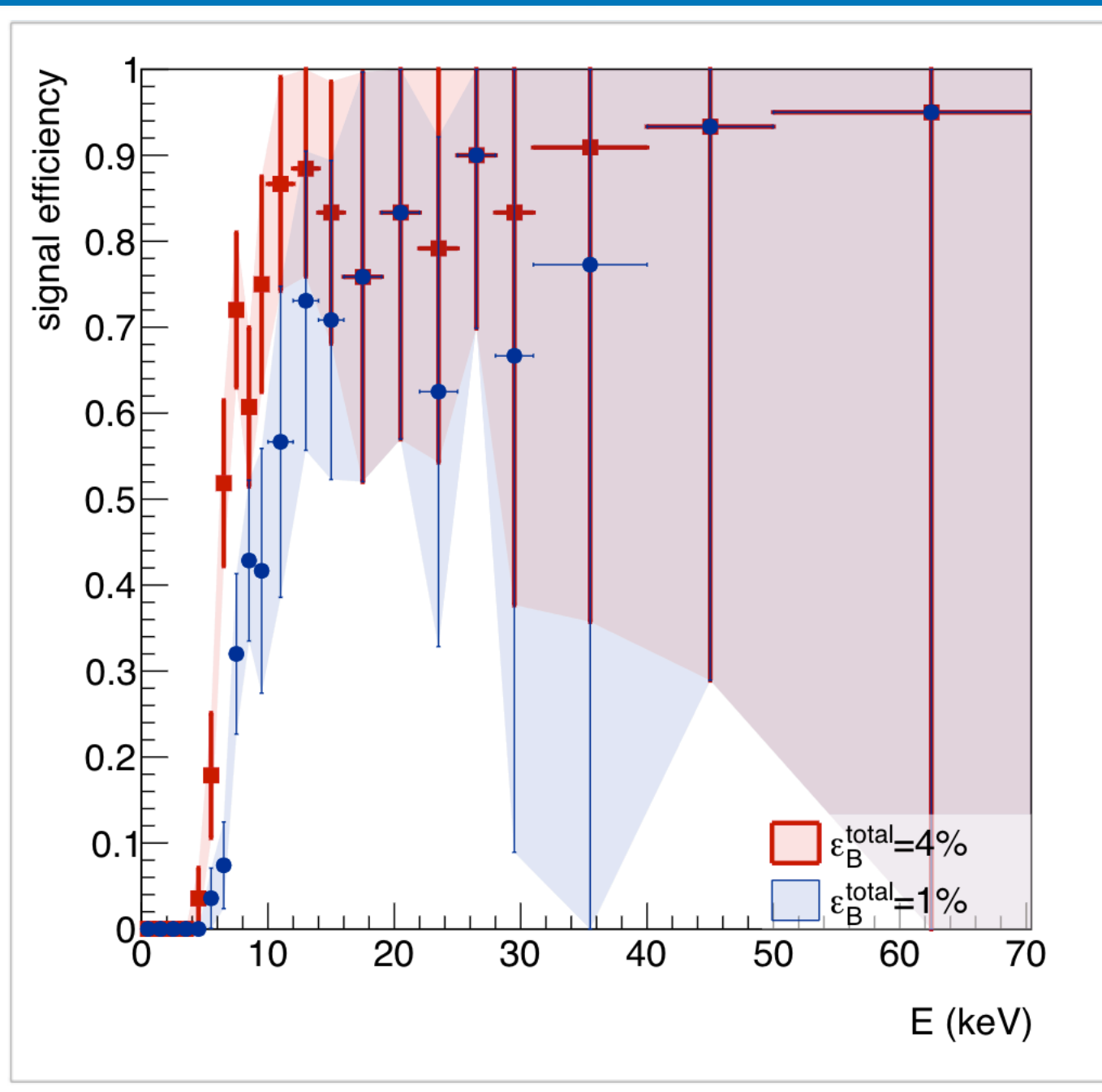
- optical sensors are able to provide high granularities along with very **low noise** level and **high sensitivity**;
- optical coupling allows to keep sensor **out of the sensitive** volume (no interference with HV operation and lower gas contamination);
- suitable lens allow to acquire **large surfaces** with small sensors;



- The use of **transparent electrodes** below GEM stack can be exploited to accelerate electrons producing up to **~10 times more light**

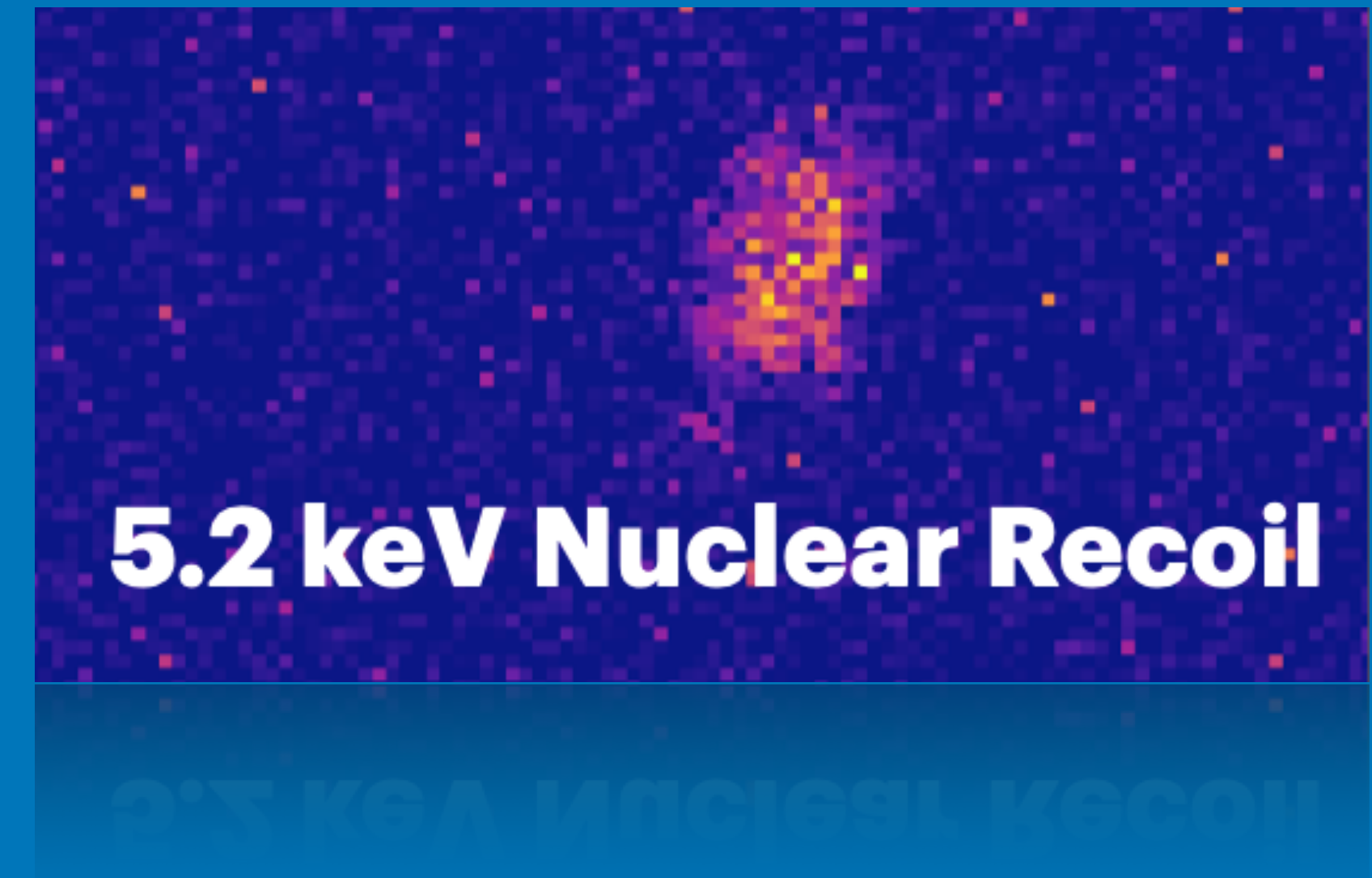


Future Application: recoils imaging for DM



working point	Signal efficiency			Background efficiency		
	ε_S^{presel}	ε_S^δ	ε_S^{total}	ε_B^{presel}	ε_B^δ	ε_B^{total}
WP ₅₀	0.98	0.51	0.50	0.70	0.050	0.035
WP ₄₀	0.98	0.41	0.40	0.70	0.012	0.008

A sizeable efficiency in the range 5-10 keV was measured while more than **95% (99%) ^{55}Fe photons** were **rejected**



Development tools and R&D

Study and production of dedicated sensors:

- Improve Timing Performance;
- Low Radioactivity: replace radioactive parts (as classic PCB);
- Less expansive: focus on custom needs