Contribution ID: **31** Type: **Oral contribution**

Development of 3D-Segmented Scintillator Particle Detector

Plastic scintillator detectors with 3D granularity and sub-nanosecond time resolution provide simultaneous particle tracking, identification, and calorimetry. The 3DET R&D collaboration has developed a novel additive manufacturing technique that enables the monolithic fabrication of finely segmented 3D scintillators, consisting of a matrix of optically isolated scintillating voxels with 3D-printed reflective materials to enhance light confinement. To improve the light yield, different types of reflective filaments have been developed and tested.

Moreover, several matrices of optically isolated scintillating voxels based on boron loaded scintillator are produced and evaluated using thermal neutron sources to study their neutron-capture capabilities.

We present recent developments in reflective filament materials, together with experimental results from prototype characterization studies, including measurements of light yield and optical crosstalk.

This work demonstrates a scalable, cost-effective, and time-efficient approach for the production of next-generation scintillator detectors with arbitrary geometries, enabling compact, modular, and high-performance particle detection systems.

Primary author: KOSE, Umut (ETH Zurich)

Presenter: KOSE, Umut (ETH Zurich)

Track Classification: WG6: Detector Physics