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InGrid: Pixelated Micromegas detectors for a pixel TPC

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Within the LCTPC collaboration several possibilities to build a time projection chamber for a linear collider are studied. In all concepts, micro-pattern gaseous detectors (MPGD) are used as amplification structure. Compared to the traditional pad-based readouts used in most cases, a pixelated TPC is a new approach.
Only pixel ASICs can reflect the high granularity of MPGDs from the readout side. The idea to combine these two technologies was already conceived ten years ago. Such devices, called InGrids, are produced in a photolithographic process, when a grid is post-processed on a Timepix ASIC.

While the first InGrids were built on a single chip basis at the University of Twente, today whole wafers with 107 chips can be processed at the Fraunhofer IZM Berlin.
Such a mass production is one cornerstone on the way to a pixel TPC. As a first step, a demonstrator module with about 100 InGrids is under development in our group. Another key element for this project is the system to read out such a module. The Scalable Readout System (SRS), developed by the RD51 collaboration, is suitable for this task as it is based on a modular structure, that can be extended from a single chip readout to larger systems.

In test beam campaign with a sub-component of the demonstrator module the readout system, the InGrid detectors and other components were successfully tested.
Besides these results, the roadmap to a pixel TPC demonstrator will be presented.

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