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New approaches to high energy physics sensors by CiS

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The CiS Forschungsinstitut fuer Mikrosensorik is engaged in developments of radiation detector technologies on several different fields. Current projects are dealing with large area thinned sensors, active edge sensors, 3D sensors, sensor-chip packaging technologies and defect engineering.

For large area sensors, the need for smaller thicknesses can be approached by etching cavities to the sensors' back side while guaranteeing stability on wafer level by thick frames at the edges. An n-in-p pixel run with membranes up to 4x4 cm² and thicknesses of 100 and 150 µm was finished successfully. The technology is currently transferred to 6" wafer size. First results of etching trials with dummy wafers with larger thinned areas will be shown as well.

An active edge sensor run is finished. Three different side wall doping methods (plasma implantation, ion implantation, diffusion) have been tested in combination with two wafer thicknesses as well as with n- and p-substrates. Electrical measurements show the functionality of sensors with inactive edge widths down to 50 µm.

A new innovative approach to 3D processed sensors is being pursued by using plasma etched trenches as isolation between pixels in planar pixel sensor technology. This will allow a modular design and a reduction in cost and time for prototyping for different customers and applications.

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