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MARTHA –First measurement results

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In order to achieve a pixel diode inherent signal amplification, low-gain avalanche diodes (LGADs) have come into focus of pixel detector developments. However, in contrast to conventional diode arrays, the detector response in the pixel gap areas is still problematic for LGADs.

MARTHA, an acronym for Monolithic Array of Reach Through Avalanche photo diodes, is a novel concept for proportional mode APDs, that provides a 100% fill factor and a high detection efficiency also in the gap regions. An n-doped field drop layer between the n+ pixel structure and an unstructured p-doped multiplication layer suppresses electric field peaks at the pixel edges and leads to a fairly homogeneous amplification over the sensor area.

Edge breakdown suppression could already be demonstrated by static measurements on special diodes. In the following talk we present first dynamic and position dependent measurements on segmented sensors.

Primary experiment

Authors: BÄHR, Alexander; Mr KOFFMANE, Christian (Semiconductor Laboratory of the Max-Planck-Society); Dr PRINKER, Eduard (Semiconductor Laboratory of the Max-Planck-Society); Dr SCHOPPER, Florian (Semiconductor Laboratory of the Max-Planck-Society); Mr SCHALLER, Gerhard (Semiconductor Laboratory of the Max-Planck-Society); Ms DAMORE, Jasmin (Semiconductor Laboratory of the Max-Planck-Society); Dr NINKOVIC, Jelena (Semiconductor Laboratory of the Max-Planck-Society); Dr TREIS, Johannes (Semiconductor Laboratory of the Max-Planck-Society); Mr HENSEL, Martin (Semiconductor Laboratory of the Max-Planck-Society); Mr RICHTER, Rainer (Semiconductor Laboratory of the Max-Planck-Society)

Presenter: BÄHR, Alexander

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