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DEEP_3D Project: a monolithic 3D detector for neutron imaging

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Neutron imaging provides information on materials and structures otherwise opaque to X-rays. Neutron sensors with high spatial resolution and high efficiency find application on disparate number of fields.

The detection of neutrons by using semiconductor materials, that are are not sensitive to neutrons, act by using converter materials that can emit light, charged particles, gamma-rays or their combinations.

The most important converter materials are Boron-10 and Lithium-6, which emit mainly charged particles, whereas Gadolinium-157 and Cadmium-113 emit gamma rays and secondary electrons.

The aim of DEEP_3D (Detectors for neutron imaging with Embedded Electronics Produced in 3D technology) project, financed by INFN V commission, is the realization of a 3D monolithic detectors for neutrons coupled with boron, lithium or their combination.

The talk will cover aspects relevant to the electronics design, layout and validation of the key technological steps of these innovative 3D pixel sensors.

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