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The Nuova Officina Assergi: future perspectives beyond DarkSide-20k

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The Nuova Officina Assergi (NOA) is a functional Research and Technological Unit operational at LNGS since autumn 2022. Conceived and built within the framework of the DarkSide-20k experiment, it is the most advanced infrastructure flagship of the INFN, for the production and integration of silicon devices operating at cryogenic temperatures. It consists of a ISO6 clean room of 420 m² designed to work with a reduced radon concentration and is equipped with cutting-edge technology machines: a cryogenic Silicon device probe, a semi-automatic dicing system, a high-speed dual bond head flip-chip bonder and an ultrasonic wedge-wedge and ball-wedge wire bonder. The next two years the facility will host the DarkSide-20k activities for the packaging and assembly of large area cryogenic photosensors, customized by FBK and transferred to LFoundry for the massive production of more than 10000 optical modules. In perspective NOA, could offer a valid alternative to industrial processes, becoming an opportunity for all the collaborations and research centers, interested in the development of emerging technologies of interconnections for the integration of customized SiPMs. Possible field of interest could be backside-illuminated (BSI) devices and Trough Silicon Vias (TSV) or hybridization and module integration of hybrid and monolithic pixel detectors. In the following we will report in details the NOA facility as a possibility for assembling electronic devices for dark matter detectors.

Submitted on behalf of a Collaboration?

No

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