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Integrated housing for Silicon Photomultipliers for future Ring Imaging Cherenkov photo-detectors

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Silicon Photo-Multipliers (SiPM) are attractive photo-sensors for many different applications. SiPM with improved robustness to radiation could be used for future particle detectors in high radiation environments, operating at a sufficiently low temperature and with regular annealing procedures to mitigate the high noise due to the absorbed radiation dose.
A modular housing solution, based on fully autonomous functional units integrating together all required functions, including passive cooling, has been successfully installed in LHCB/RICH upgrade-I. The evolution to active cooling for SiPM is being studied: a module with high fill-factor housing for O(2mm) pixel size multi-channel SiPM devices, capable to tessellate a large area maximizing the geometrical acceptance, providing integrated local active cooling of the sensors (possibly heating for annealing), with capability to operate in a wide range of temperatures, managing the high channel density for all the front-end/back-end readout electronics and all other required ancillary systems for autonomous operation.

Requested length

10 minutes

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