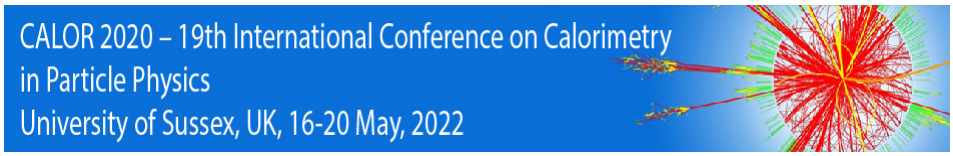

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Photodiode read-out system for the calorimeter of the HERD experiment

The HERD experiment is a future space experiment which will be installed on the Chinese Space Station in 2027. The detector is based on a 3D, homogeneous, isotropic, deep and finely segmented calorimeter, and it will be capable to detect particles from every direction. Thanks to its large acceptance and energy resolution, it will expand the measurements of proton and nuclei fluxes up to the cosmic ray knee region (about 1 *PeV*), and *electron+positron* flux up to tens of *TeV*.
The calorimeter will be composed by about 7500 LYSO cubic crystals. Every crystal is coupled with two independent read-out systems: the first is based on wavelength shifting fibers coupled to Intensified scientific CMOS, the second one is based on a system of two photodiodes coupled to a specifically designed front-end electronics. The two photodiodes have different responses with respect to scintillation light, in order to increase the dynamic range of the read-out system. This is also expanded by the use of the front-end electronics chip HiDRA2, which features a very high dynamic range, low noise and small power consumption. The latter is a necessary requirement for a space experiment due to the limited power budget. All these characteristics are necessary to obtain a dynamic range higher than 10⁷, in order to measure signals ranging from the small MIP energy deposit for calibration purposes to typical releases caused by hadronic showers induced by *PeV* protons.
In this poster we will describe the main characteristics of the photodiode read-out system and we will discuss the performances of the first prototypes that were tested so far.

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