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# OSCAR: a modular low-threshold hodoscope for low energy nuclear reactions

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The increasing availability of new low-energy radioactive ion beams facilities in the world calls for the building of new detectors. They should have very low detection and identification thresholds, good isotopic resolving power and large granularity. In this way it would be possible to make correlations studies that are needed to probe the structure and/or the dynamics of nuclear systems very far from the stability valley. In this respect, the use of active gas target system seems very promising, especially for the study of low energy direct nuclear reactions. In some cases it would be useful to couple these gas target systems with modular, high granularity hodoscopes to detect high energy reaction ejectiles (that can punch through the gas). As a possible ancillary detector for low energy studies, we developed a new hodoscope, OSCAR. It is formed by a single-sided silicon strip detector (16 strips, 20 \mum nominal thickness, the strip dimension being 3×50 mm) coupled with 16 silicon pad detectors (arranged in a 4×4 configuration, 300 \mum thick, the pad dimension being 10×10 mm). The observed identification thresholds are of the order of ≈ 1 A MeV for isotopes up to Be. A careful analysis of the thickness uniformity has been performed on the silicon strip detector, both with \alpha-source and with reaction ejectiles; this led to determine the maximum gradient of thickness that allows a good isotopic identification of light fragments (up to Li/Be). The very good energy and angular resolution of this hodoscope has been exploited in the study of the \alpha-\alpha correlations due to the 8Be decay in 40,48Ca+40,48Ca reactions at 35 A MeV. Possible physical cases of couplings of this hodoscope with active gas target systems will be discussed.

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