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Development of a detector for a gravity measurement on positronium at the AEgIS experiment at CERN

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The primary goal of the AEgIS experiment at CERN is to measure the gravitational acceleration on neutral antimatter. Positronium (Ps), the metastable bound state of an electron and a positron, is a suitable candidate for a force-sensitive inertial measurement by means of deflectometry/interferometry. In order to conduct such an experiment, the impact position and time of arrival at the detector of Ps atoms must be detected simultaneously with a spatial resolution of better than 10 μm and a time-resolution in the order of 100 ns. The detection of a low-velocity Ps beam with a spatial resolution of (88 ± 5) μm was demonstrated [1]. Based on the methodology employed in [1], a hybrid imaging/timing detector with increased spatial resolution was developed. The performance of a prototype was tested with a positron beam. The concept of the detector is presented in detail and the results of the tests are shown.

[1] C. Amsler et al. NIM in Ph. Research B 457 (2019) 44-48

TIPP2020 abstract resubmission?

Yes, this would have been presented at TIPP2020.

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