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Silicon Drift Detectors for the kaonic atom X-ray measurements in the SIDDHARTA experiment

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Silicon Drift Detectors (SDDs) are X-ray detectors with the outstanding performance for the measurement of the kaonic atom X-ray lines. The measurement of the kaonic hydrogen/deuterium X-rays with a high background suppression is a crucial issue, because of the small X-ray yields (a few % in kaonic hydrogen and much smaller in kaonic deuterium) and high background usually accompanying the available kaon beams. Large-area SDDs are being developed for the kaonic X-ray measurements in the SIDDHARTA experiment at LNF (Italy). The SDDs will provide an excellent background suppression using the time correlation between the kaonic X-rays and the back-to-back correlated K^+K^- pairs produced by the DAΦNE electron-positron collider. This first application of these SDDs is an innovation for X-ray spectroscopy in general, and for the kaonic atom X-ray measurements in particular. The X-ray energy and width of the kaonic hydrogen $K\alpha$ line will be determined most accurately, and the kaonic deuterium $K\alpha$ line will be measured for the first time. In this talk, the experimental method to measure the kaonic X-rays with the SDDs is presented as well as a comparison with the CCD X-ray detectors used in the previous experiment.

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