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## Imaging Detector for Ultracold Neutrons using SOI Pixel Sensors and its Application to an Experimental Test of the Weak Equivalence Principle

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The Weak Equivalence Principle (WEP) is one of the fundamental concepts of the theory of General Relativity. It has long been subjected to experimental tests, and possible anomalies are evaluated using the ratio of inertial and gravitational masses or the Eotvos parameter. However, most experimental tests have been performed in the classical regime and only few tests have been attempted in the quantum regime. In this talk, we propose an experimental test of the WEP in the quantum regime by simultaneously measuring the energy and length scales of gravitationally bound ultracold neutrons. We develop a time-resolving imaging device based on an event-driven SOI pixel sensor with a neutron converter layer. We will present the detailed design and characteristics of this detector.

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