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A prototype SOI pixel sensor for CEPC vertex

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The Circular Electron Positron Collider (CEPC) has been proposed in China as a Higgs and/or Z factory. A pre-CDR study has been conducted which identified critical R&Ds for each sub-system of the detector and the accelerator. Pixel sensors with high spatial resolution and low material budget are required to construct the inner most layers of vertex sub-detector. As a part of R&D activities, a small prototype of SOI pixel sensor featuring 16 μm pitch and 75 μm thickness has been developed accordingly. The pixel matrix is arranged in 64 columns and 64 rows, with analog readout in one half of the matrix and binary readout in the other half. The pixel pitch was chosen by a TCAD simulation so that even with binary readout the sensor is able to achieve a point resolution better than 3 μm . Characterization of sensor has been performed in the lab and encouraging results by Fe55 source test and infrared laser test will be presented. Lessons learned from this prototype will be discussed and feed back to the next design.

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