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The ultralight DEPFET Pixel Detector of the Belle II Experiment

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An upgrade of the existing Japanese flavor factory (KEKB in Tsukuba, Japan) is under construction, and foreseen for commissioning by the end of 2017. This new e+e- machine (SuperKEKB) will deliver an instantaneous luminosity 40 times higher than the world record set by KEKB.

In order to be able to fully exploit the increased number of events and provide high precision measurements of the decay vertex of the B meson systems in such a harsh environment, the Belle detector will be upgraded (Belle II) and a new silicon vertex detector, based on the DEPFET technology, will be designed and constructed. The new pixel detector, close to the interaction point, will consist on two layers of DEPFET active pixel sensors. This technology combines the detection together with the in-pixel amplification by the integration, on every pixel, of a field effect transistor into a fully depleted silicon bulk. In Belle II, DEPFET sensors thinned down to 75 μm with low power consumption and low intrinsic noise will be used.
The first large thin multichip production modules have been produced and the characterization results will be presented in this contribution.

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