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The Belle II Silicon Vertex Detector

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The KEK-B machine and the Belle experiment in Tsukuba (Japan) are now undergoing an upgrade, leading to an ultimate luminosity of 8x10^35 cm-2 s-1 in order to measure rare decays in the B system with high statistics. The previous vertex detector cannot cope with a 40-fold increase of luminosity and thus needs to be replaced. Belle II will be equipped with a two-layer Pixel Detector, surrounding the beam pipe, and four layers of double-sided silicon strip sensors (SVD=Silicon Vertex Detector) at higher radii than its predecessor. The SVD will have a total sensitive area of 1.14m2 and 223,744 channels - twice as many as the old detector.
All silicon sensors will be made from 6" wafers in order to maximize their size and thus reduce the relative contribution of support structure. The forward part has slanted sensors of trapezoidal shape to improve the measurement precision and minimize the amount of material as seen by particles from the vertex. Fast-shaping front-end amplifiers will be used in conjunction with an online hit time reconstruction algorithm in order to reduce the occupancy to the level of a few percent at most. A novel "Origami" chip-on-sensor scheme is used to minimize both the distance between strips and amplifier (thus reducing the electronic noise) as well as the overall material budget.
We will report on the status of the Belle II SVD and its components, including sensors, front-end detector ladders, mechanics, cooling and the readout electronics.

quote your primary experiment

Belle II

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