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The Belle II Upgrade Program

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The Belle II experiment at the SuperKEKB e+e- collider has started data taking in 2019 with the perspective of collecting 50ab⁻¹ in the course of the next several years. The detector is working well with very good performance, but the first years of running are showing novel challenges and opportunities for reliable and efficient detector operations with machine backgrounds extrapolated to full luminosity. For this reason, and also considering that an accelerator consolidation and upgrade shutdown is being studied for the timeframe of 2026-2027 to reach the target luminosity of 6E35 cm⁻²s⁻¹, Belle II has started to define a detector upgrade program to make the various sub-detectors more robust and performant even in the presence of high backgrounds, facilitating the SuperKEKB running at high luminosity.

This upgrade program will possibly include the replacement of some readout electronics, the upgrade of some detector elements, and may also involve the substitution of entire detector sub-systems such as the vertex detector. The process has started with the submission of Expressions Of Interest that are being reviewed internally and will proceed towards the preparation of a Conceptual Design Report currently planned for 2022. This paper will cover the full range of proposed upgrade ideas and their development plans.

Primary experiment

Belle II

Author: FORTI, Francesco (INFN Sezione di Pisa and Universita' di Pisa)

Presenter: FORTI, Francesco (INFN Sezione di Pisa and Universita' di Pisa)

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