

Prospects for the spin structure study of hyperons using heavy quark decays at Belle II

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The Belle II experiment is a substantial upgrade of the Belle detector and will operate at the SuperKEKB energy-asymmetric e^+e^- collider. The accelerator has already successfully completed the first phase of commissioning in 2016 and first electron positron collisions in Belle II were obtained on April 26, 2018. The design luminosity of SuperKEKB is $8 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1}$ and the Belle II experiment aims to record 50 ab^{-1} of data, a factor of 50 more than the Belle experiment. In this talk, we will explain the idea of a hyperon spin structure study using heavy quark decays: In weak decays of heavy quarks, the daughter quarks are highly polarized. On the other hand, one can naively expect that the fraction of the baryon spin carried by a quark is equal to the polarization transfer of the quark to the baryon. In this way, one can experimentally determine the spin structures of hyperons in decays of heavy quarks. Spin structures of ground state hyperons (i.e., Lambda and Sigma) are interesting in the context of the proton spin structure puzzle. In addition, excited states can be also studied to identify exotic hyperons. Especially in Lambda(1405), a two pole structure may be seen as a mass dependence of the polarization.

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