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Highlights from SuperKEKB Commissioning for early stage of Nano-Beam Scheme and Crab Waist Scheme

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The SuperKEKB electron-positron collider has been commissioned at KEK to study a new physics in the B-meson decays. In order to accomplish this purpose, the luminosity of 40 times of the highest luminosity record at KEKB, 8 x 10^{35} $cm^{-2}s^{-1}$ is necessary. We have applied a novel "nano-beam scheme"to squeeze the beta function at the interaction point (IP) down to 1 mm in the vertical, 60 mm in the HER and 80 mm in the LER in the horizontal direction, respectively. The beta function at the IP is the smallest value for the existing circular colliders in the world. However, the design value is 0.3 mm which is about 1/3 of the achievement. Recently, we also applied a "crab waist scheme"which proposed by P. Raimondi et al. to improve the luminosity more than the nano-beam scheme. We present the early stage of the commissioning of the nano-beam scheme as well as the crab waist scheme in Autumn run 2019 and Spring run 2020.

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