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Sextupole magnets with variable tilt angles for SuperKEKB

SuperKEKB is an electron-positron collider with the design peak luminosity of $8 \times 10^{35} \text{cm}^{-2} \text{s}^{-1}$. In order to achieve this high luminosity, it is important to make the beam size small at the interaction point, especially in the vertical direction. Skew sextupole magnets were found to be effective in order to make the small beam sizes during KEKB operation. At SuperKEKB, a novel idea of tilting the normal sextupole magnets to control the ratio of skew sextupole field component to normal sextupole field component has been proposed for the positron ring. Twenty-four sextupole magnets were modified and new tilting tables were fabricated to control the normal/skew component ratio by tilting the magnets. The tables were designed so that the sextupole magnets can be tilted from -30 degrees to +30 degrees (-523.58 mrad to +523.58 mrad), with a setting accuracy of 0.1 mrad. Magnet movers for controlling the horizontal and vertical positions, as well as the tilting angles, had been developed elsewhere before, though a table of such a large range, with 0.1 mrad setting accuracy for optics correction and luminosity tuning, is unique. The first commissioning of the tilting sextupole magnets at SuperKEKB will be presented.

Summary

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