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Nb₃Sn superconducting multipole wiggler as a vertically polarized hard X-ray source

Tuesday 3 June 2025 16:00 (2 hours)

Vertically polarized superconducting wigglers enable unique hard X-ray experiments based on horizontal optical setups. However, their implementation in modern low-emittance storage rings has been limited due to significant emittance growth. We present a vertically polarized superconducting multipole wiggler designed to reduce the impact on beam emittance. By limiting the magnetic field to 2-3 T and shortening the period length using Nb₃Sn wires with higher critical current density compared to conventional NbTi, the beam orbit amplitude and the resultant emittance growth are reduced. As a case study for the future light source project at KEK, PF-HLS (Photon Factory Hybrid Light Source), we discuss a design based on vertical circular winding coils with a sub-100 millimeter period length and a sub-100 micrometer orbit amplitude, as well as its influence on beam emittance.

Footnotes

Paper preparation format

Region represented

Asia

Funding Agency

Author: SAITO, Hiroto (High Energy Accelerator Research Organization)

Co-authors: TSUCHIYA, Kimichika (High Energy Accelerator Research Organization); MITSUDA, Chikaori (High Energy Accelerator Research Organization); HARADA, Kentaro (High Energy Accelerator Research Organization); SHIMOSAKI, Yoshito (High Energy Accelerator Research Organization); OBINA, Takashi (High Energy Accelerator Research Organization)

Presenter: SAITO, Hiroto (High Energy Accelerator Research Organization)

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