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Test coil-unit fabrication of Nb3Sn superconducting multipole wiggler for next generation light source in KEK-PF

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Recently, KEK PF has started developing a superconducting multipole wiggler (SC-MPW) for an application in next-generation light source ring. The SC-MPW is expected to be a key insertion device for the light utilization of a wide wavelength region by aiming at high-brightness and high-energy X-ray production while keeping the stored beam energy as low as 2.5 GeV. In addition, the short period length of multipole wiggler not only lowers the light spread and increases the effective photon flux, but also reduces the beam orbit amplitude, which leads to suppressing the emittance growth in a low emittance ring. In our application, the magnetic field more than 2.5 T is required on the central beam orbit even in a short period length less than 80 mm with a wide gap more than 30 mm that secures the beam orbit region. As we need to investigate the candidate of Nb3Sn wires and to study the coil-fabrication techniques which meet a use as multipole wiggler, PF has completed the first prototype-coil unit consisting of three poles and successfully conducted excitation tests at the low current. The detailed fabrication of test-coil unit and the prospects for high-current testing will be reported.

Footnotes

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Region represented

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