

Oral | Applications: Motors and others

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 ㏒ Convention Hall(300, 3F)

[O6] Applications

Session Chair: Dr. Yusuke Hirayama(National Institute of Advanced Industrial Science and Technology)

11:20 AM - 11:35 AM JST | 2:20 AM - 2:35 AM UTC

[O6-3] Applications of Permanent Magnets at the National Synchrotron Light Source-II

*Toshiya Tanabe¹, Dean Hidas¹, James Rank¹, Marco Musardo¹, Thomas Brookbank¹, Brian Eipper¹, Patrick N'Gotta¹ (1. Brookhaven National Laboratory (United States of America))

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Permanent magnets (PMs) have been employed in various insertion devices at synchrotron light sources for many years. Nd₂Fe₁₄B magnets, enhanced through the Dy diffusion process, are utilized in both in-vacuum undulators. Cryogenic permanent magnet undulators [1] sometimes employ Pr₂Fe₁₄B or (Nd_xPr_{1-x})₂Fe₁₄B magnet to operate at the temperature lower than the value when Nd₂Fe₁₄B magnet starts exhibiting spin reorientation transition. The concept of the complex bend lattice has been proposed [2]. Unlike the conventional multi-bend achromat lattices commonly implemented in fourth-generation storage ring light sources, this design incorporates bending magnets composed of PM combined-function quadrupoles. For this application, Sm₂Co₁₇ magnets are employed to mitigate demagnetization effects and minimize temperature-dependent performance variations. Both pure PM structures, such as the modified Halbach-type configuration shown in Fig. 1, and hybrid structures have been investigated. This paper presents ongoing research and developments related to PM applications at the National Synchrotron Light Source-II (NSLS-II) at Brookhaven National Laboratory, USA.

[1] T. Hara, et. al., "Cryogenic permanent undulators", Phys. Rev. ST, Acc. and Beam, Vol. 7, p.050720 (2004).

[2] V. Smaluk, et. al., " Realizing low-emittance lattice solution with complex bends," Proceedings of IPAC19, Melbourne, Australia, doi:10.18429/JACoW-IPAC2019-TUPRB105.

