



Contribution ID: 1908 Contribution code: TUPS093

Type: **Poster Presentation**

## Permanent hybrid helical micro-undulators for FELs and inverse FELs

*Tuesday 3 June 2025 16:00 (2 hours)*

High-field micro-undulators are one of the key elements in most compact Terahertz and X-ray FEL projects. In our works, helical undulators of several helices, each made of a single piece of rare-earth magnet, are proposed for this purpose. We demonstrated previously the possibility of high-precision manufacturing helices with centimeter periods using the Wire Electric Discharge Machining. In this paper, we will discuss an experimental prototype micro-undulator of two oppositely longitudinally magnetized NdFeB helices with a period of 6 mm and an inner hole diameter of 1 mm, creating a transverse field close to 1 T. The magnitude of the field and/or the inner diameter of the helices can be significantly increased by using hybrid systems with two longitudinally pre-magnetized rare-earth and two pre-unmagnetized steel helices. We are currently developing methods for manufacturing, assembling and measuring the parameters of such systems with periods of 6 and 3 mm and a field of 1 T and will demonstrate the corresponding results in the presentation.

### Footnotes

### Paper preparation format

### Region represented

Asia

### Funding Agency

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**Session Classification:** Tuesday Poster Session

**Track Classification:** MC2: Photon Sources and Electron Accelerators: MC2.T15 Undulators and Wigglers