Contribution ID: **23** Type: **not specified**

R&D on HTS undulators at the European XFEL

Wednesday 8 February 2023 09:00 (20 minutes)

The undulator group at the European XFEL has started an R&D project dedicated in developing advanced superconducting undulators (SCUs) concepts. The project consists of two parts: the first one focuses on building up know-how in the design and construction of NbTi-based SCU coils, which are commercially available and established in other laboratories. The second part focuses on applying high-temperature superconductors (HTS) to SCUs . HTS based on Rare-earth barium copper oxides (ReBCO) are a very attractive option. Compared to the low-temperature superconductors (NbTi and Nb3Sn), ReBCO offer higher critical temperature, higher magnetic fields and critical currents at low temperature. I will give an insight into the concept of a hybrid undulator (HybriSCU) based on both NbTi and ReBCO and the first efforts made in the geometry design of an SCU based only on ReBCO. In addition, I will address current limitations related to the ReBCO technology in the undulator field.

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Session Classification: Alternatives magnet designs