

## **Development of permanent magnet dipoles for ESRF-EBS**

The ESRF-EBS (Extremely Brilliant Source) is an upgrade done at ESRF (European Synchrotron Radiation Facility) in the period 2015-2022. It aims to decrease the horizontal emittance and to improve the brilliance and coherence of the X-ray beams to best serve the new science opportunities. Permanent magnet longitudinal dipoles (DLs) have been developed for the ESRF-EBS upgrade. The use of permanent magnets has mainly two advantages: in the one hand, it allows a more compact distribution of magnets, since there is no need of coils and water cooling; in the other hand, it allows to reduce the running costs and the carbon footprint of the facility thanks to the removal of the power supplies associated to conventional electromagnets. In this presentation I will report about the magnetic and mechanical design of these dipoles, prototype and series magnets production including thermal compensation, magnetic measurement and tuning. I will report also about the commissioning of this now machine and the problems related to the cross-talk between magnets. Finally, I will give a feedback about the DLs after 5 years operation.

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