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## The separation-recombination dipole MBRD for the High-Luminosity LHC: from prototype to series

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The next upgrade for the Large Hadron Collider (LHC), called High-Luminosity LHC, has the aim of increasing the rate of collisions of the accelerator by a factor of ten. To achieve this goal, the dipoles and quadrupoles before and after the interaction region of the ATLAS and CMS experiments will be replaced. One of these is the separation-recombination dipole MBRD, which features a target integral magnetic field of 35 T·m in a double aperture of 105 mm, obtained with a magnetic field of 4.5 T along a magnetic length of 7.78 m. One of the main challenges in the development of this magnet is the fact that the two apertures must have the same polarity and this causes a magnetic cross-talk between the two apertures. Because of this, it has been necessary to develop a left/right asymmetric design for the coils to compensate this effect, that would have generated unwanted multipoles. Another issue related to the heavy cross-talk is a repulsive Lorentz force between apertures, which has been managed through the implementation of Al alloy sleeves assembled around the two collared apertures. The design was carried out in the framework of a CERN-INFN Genova agreement and the construction is ongoing in the industry ASG Superconductors. The 1.6 m long model was built and successfully cold tested, followed by the construction of a full-length prototype, which is currently on-going, while the construction of the series of 6 magnets is foreseen to be started on May 2021. This contribution will describe the prototype assembly status, also covering the field quality aspect, discussing the results of the warm magnetic measurements at ASG and their implication on the design of the series in terms of harmonic content.

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