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# Magnetic Measurements Results and Analysis of the First Batches of Superferric Magnets for the HL-LHC High Order Field Correction

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In agreement with CERN the LASA laboratory of INFN (National Institute for Nuclear Physics) of Milan has carried out the industrial development of a novel type of magnet, for the High Order (HO) correctors of the High Luminosity - LHC (HL-LHC) project. These corrector magnets are based on a superferric design and will be installed in the new HL-LHC insertion regions for the ATLAS and CMS Experiments at CERN. These fifty-four correctors cover different harmonic order: from skew quadrupole up to dodecapole, and all assembled in one cold mass named Corrector Package, an absolute novelty for superferric in a collider. The first magnet batches have been already manufactured by industry and tested at LASA. Magnetic measurements have been performed at low current (at room temperature) as well as at operating current (4.2 K during cold tests at LASA). The measurements have been used as production monitoring and magnet acceptance. The measurement setup, based on a rotating coil system, is described including also the commissioning of the new PCB probe, supplied by CERN. To assess the suitability for collider operation the field multipoles and the transfer function for the various magnet types are reported in the paper. The results have been also compared to the 3-D model calculations highlighting the iron saturation effects.

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