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Challenges and Results from the series Measurements of the SLS2.0 Longitudinal Gradient Bends magnets

The measurement challenges and results from the series tests assessing production quality of the main magnet' assembly, referred to as Triplet, for the upgrade of the Swiss Light Source(SLS)2.0 are described (2.0 stands for the whole renewal of the storage ring). A Triplet, which comes in four flavors, is at the heart of the seven-bend achromatic structure of SLS2.0 [1], implementing a longitudinal gradient bend (LGB) function. The requirement, from beam dynamics, of tuning the integral LGB function with an overall uncertainty of 2·10-3 relative to the nominal design value identifies (or drives) the measurement challenges. The Triplet assembly is composed of three magnets, that is, a central dipole surrounded on each side by two combined function magnets providing quadrupole and dipole components. Each Triplet element is a permanent magnet implemented with NdFeB blocks. In this contribution, a brief overview of the Triplet magnets characteristics is reported and the process of extracting measurement requirements from Triplet Finite Element (FE) simulations is illustrated. Thereafter, the authors'focus goes on the measurement procedure and tuning for both single magnets and an assembled triplet. Then, a comprehensive summary of the series measurements results is discussed.

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