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Fri-Mo-Or25-03: Longitudinal gradient bend magnets for the upgrade of the Swiss Light Source storage ring

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The photon beam brightness of synchrotron light facilities is increased by reducing the beam emittance. For the upgrade of the storage ring of the Swiss Light Source (SLS2), the lattice achieving a low emittance foresees longitudinal gradient bending (LGB) magnets producing high peak field values and quasi-hyperbolic field profiles to minimize emittance at locations of radiation.

Two types of technologies are studied: a 1.7 T peak field magnet based on permanent magnet materials (PM-LGB) and a superconducting version (SC-LGB) working at 4T peak field value to be upgraded to 6T in future. The baseline scenario consists in commissioning the SLS2 with 60 PM-LGB assemblies first and to exchange at a later stage three PM-LGBs by superconducting ones providing a higher peak field value. Thus, the design must foresee interchangeability. In this paper, we focus on the magnetic and mechanical design aspects of the PM-LGB and on the main mechanical constraints of the SC-LGB.

Authors: CALZOLAIO, Ciro (Paul Scherrer Institut); Dr NEGRAZUS, Marco (Paul Scherrer Institut); GABARD, Alexander (Paul Scherrer Institute); Mr SIDOROV, Serguei (Paul Scherrer Institut); LERCH, Philippe (PSI - Paul Scherrer Institut); SANFILIPPO, stephane (Paul Scherrer Institut)

Presenter: CALZOLAIO, Ciro (Paul Scherrer Institut)

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