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First magnetic experience with APPLE X knot undulators for SLS 2.0

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The next generation of synchrotrons will have undulators with shorter periods, stronger magnetic fields, and thus higher radiation power. Consequently, concepts for reducing on-axis heat load will become more relevant. One possible idea is to introduce so-called APPLE "knot"undulators that shift the main energy peak off-axis. Thanks to almost on-axis injection, APPLE X undulators with a round vacuum chamber can be used for the upgraded SLS 2.0 at the Paul Scherrer Institute (PSI). This contribution presents an adaptation of the APPLE "knot"concept tailored to the needs of SLS 2.0 in the form of two-meter-long APPLE X undulators with a 36 mm period length and a gap of 11.5 mm. Our design faces the challenge of dealing with up to 16 different magnetization angles introduced by combining and merging NdFeB magnets into four arrays with peak fields around 1 T. Consequently, the magnetic design and the first measurement results are discussed with an outlook on magnet optimization.

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