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A Low-Temperature-Dependent Calibration of Hall probes for CPMU

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Abstract

A cryogenic permanent-magnet undulator (CPMU) with a period of 18mm and a magnetic length of 2m is being constructed for the Taiwan Photon Source (TPS). The CPMU with a gap of 5.5 mm can generate an effective magnetic field of 1.2 T at 150 K. When the field measurement, the temperature of hall probe will be drop at cryogenic temperature. Therefore, a field strength calibration and thermostatic temperature control system is necessary. The range of field strength calibration is from 5.5 to ± 1.5 T at a homemade dipole electromagnet. A 2-axis compact SENIS hall probe is mounted on homemade copper plate in vacuum chamber. The temperature control system consists of a cryocooler, PT100 sensor and a heater to control the Hall probe temperature. Finally, a higher-order polynomial surface fitting to analysis measurement data from calibration system. The field strength maximum error is < 0.2 G at fitting surface. The detailed temperature dependent calibration system is presented in this poster.

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