

Status of the development of cryogenic permanent magnet undulators at TPS

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A PrFeB-based cryogenic permanent magnet undulator (CPMU) is under construction at the Taiwan Photon Source (TPS) to provide high brilliant X-rays. When the magnets are cooled at 77 K, the CPMU with a period length of 15 mm can generate an effective magnetic field of 1.77 T at a gap of 3 mm. The main features of the TPS CPMU is low-phase-error characteristics with high thermal budget to various heat loads. The low-phase-error performance can be realized by adopting force-compensation modulus on the out-of-vacuum girders with a four-support-points configuration. Two cryo-coolers with a cooling capacity of 200W at 80 K allow a high beam-induced heat load with external heat transfer up to a few hundred watts. An *in-situ* and vacuum compatible field measurement system has been developed in order to characterize the magnetic field at cryogenic temperatures. In this paper, the relevant technology and technical challenges for the TPS-CPMU will be discussed. Some results of the CPMU associated with phase errors, magnetic field quality at cryogenic temperature and vacuum performance will be presented as well.