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Detection of High Flux Synchrotron Radiation Based on Diamond Detector for HEPS

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High Energy Photon Source (HEPS) with a beam energy of 6GeV and emittance less than 1.0nm·rad will be constructed in China, which can provide high-brilliance hard X-ray in the order of 10¹³. The broadband and high-flux monochromatic beam flux and white beam flux need new detector other than the ion chambers for measurement in case of saturation under high-flux conditions.

Diamond X-ray detector for the beam position monitoring and high flux X-ray detection is developing for High Energy Photon Source in China. The diamond detector is designed with multilayered structure to realize the function of beam position monitoring and X-ray intensity measuring. The first layer is the four-quadrant-like position-sensitive device and the other layers are fabricated to single pixel for X-ray intensity measuring. The diamond detector has advantages over other detector materials: a low atomic number resulting in a low absorption cross-section when used as beam position monitor and a high radiation and wide linear range when used as beam intensity measuring. The polycrystalline chemical-vapor-deposition diamond detectors with aluminium contact have been tested at 1W2B beamline at Beijing Synchrotron Radiation Facility (BSRF).

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