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Performance of the beam position monitor for the Advanced Photon Source

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Performance measurement and analysis of the Advanced Photon Source (APS) beam position monitor (BPM) electronics are reported. The result indicates a BPM resolution of 0.16/I micron/sqrt(Hz)/mA, where I is the stored single bunch current. For the miniature insertion device (ID) BPM, the result was 0.1/I micron/sqrt(Hz)/mA. The improvement is due to the 3.6 times higher position sensitivity (in the vertical plane), which is partially canceled by the lower button signal by a factor of 2.5. The minimum single bunch current required was roughly 0.03 mA. The long-term drift of the BPM electronics independent of the actual beam motion was measured at 2 micron/hr, which settled after approximately 1.5 hours. This drift can be attributed mainly to the temperature effect. Implication of the BPM resolution limit on the global and local orbit feedback systems for the APS storage ring will be also discussed.

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