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Designs and measurements of a new Superbend-magnet for WALS

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In order to provide hard X-rays with a 1.5 GeV electron ring, a new superbend-magnet will be used in the middle of each standard cell at Wuhan Advanced Light Source (WALS). The design, assembly, and detailed magnetic measurement of the superbend-magnet prototype has been finished. It is a three-stage combined magnet, with a high-field permanent magnet in the middle and two low-field electromagnets with transverse gradient on each side. The results of magnetic measurement show that the central magnetic field reaches 3.67 T in a gap of 14.72 mm, and the range of high field region (> 3.5 T) is larger than 40 mm in the longitudinal direction. The uniformity of the field integral is controlled below 5×10^{-4} across the good field region. Two low-field magnets are designed as water-cooled resistive magnets which can be used to correct the integrated dipole and quadrupole components.

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