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## Design, Fabrication, and Testing of a 1.9 m Long, 16.5 mm Period NbTi Superconducting Undulator for the Advanced Photon Source Upgrade

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Superconducting undulator (SCU) technology has been in use at the Advanced Photon Source since 2013. Due to the successful and reliable operation of the existing SCUs, the Advanced Photon Source upgrade project has decided to expand the use of NbTi-based SCUs. The first new magnets to be designed and fabricated are 1.9 m long with a period length of 16.5 mm. NbTi superconductor is used for coil winding and there are four separate coils wound on the mandrel to produce the main undulator field along with end compensation and distributed dipole compensation. The magnetic design, fabrication details, assembly, and testing are described in detail.

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