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## Installation and commissioning of the APS-U bunch lengthening system

*Wednesday, 22 May 2024 16:00 (2 hours)*

A new bunch lengthening cryomodule based a single-cell superconducting cavity operating at the 4th harmonic (1408 MHz) of the main RF has been installed into Argonne's Advanced Photon Source (APS) storage ring as part of the U.S. DOE APS Upgrade project. The system will be used to improve the Touschek lifetime by increasing the bunch length by up to several times. The 2-meter long cryomodule is installed in the first half of one of the APS straight sections. The superconducting cavity will operate at 2.1 K and provide up to 1.3 MV of potential for bunch lengthening. System features include a pneumatic slow mechanical tuner and a pair of adjustable RF power couplers to adjust the loaded quality factor, providing a means of stabilizing the beam over a wide range of beam currents and fill patterns. Beam induced higher-order modes (HOMs) are extracted along the beam axis and damped using a pair of room temperature beam line absorbers based on silicon carbide. The cavity and cryomodule are cooled using a new 4.3 K liquid helium refrigerator combined with JT expansion inside cryomodule. We report here on results of initial cool down and testing.

### Footnotes

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### Region represented

North America

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