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Low-emittance SRF photo-injector prototype cryomodule for the LCLS-II high-energy upgrade: design and fabrication

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The high-energy upgrade of the Linac Coherent Light Source II (LCLS-II-HE) will extend the X-ray energy range up to 20 keV. The goal is to produce low emittance (0.1 mm·mrad) electron bunches (100 pC/bunch) and accelerate 30 μA beams through the superconducting linac to 8 GeV. A low-frequency superconducting radio-frequency photo-injector (SRF-PI) will be a key aspect of the upgrade. An SRF-PI cryomodule with a 185.7 MHz Quarter-Wave Resonator (QWR) for operation at a cath-ode field of 30 MV/m and a cathode system compatible with high quantum efficiency photo-cathodes operating at 55-80 K or 300 K are currently being developed. We report on the design and fabrication status of the SRF-PI cryomodule and cathode system for LCLS-II-HE.

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Footnotes

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