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## **A design of the C-band RF photoinjector cavity for testing photocathodes under extreme fields**

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We present an RF and engineering design of a 1.6-cell RF photoinjector at 5.712 GHz. Two designs were developed: one for the room temperature and another one for cryogenic temperature operations. At Los Alamos we are constructing a facility for testing photocathodes that produce high-quality electron bunches under an intense RF electric field in excess of 100 MV/m. The basic 1.6-cell RF photoinjector geometry was designed at SLAC and UCLA. The cavity had an optimized shape to increase the shunt impedance and minimize the surface fields. The two cells were coupled individually, from a waveguide on the side of the cells. The coupling was designed to ensure a phase difference of 180 degree between the two cells, for a pi-mode operation. The room temperature RF injector is currently in fabrication and will be tuned and tested in Los Alamos this year. The cryo-temperature design will be fabricated and tested at UCLA.

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