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C-band photoinjector radiofrequency cavity design for enhanced beam generation

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We present our 1.6-cell radiofrequency cavity design for a photoinjector under development for producing intense electron bunches with 250-pC beam charge and normalized emittance below 100 nm rad for cryogenic temperature operation. The cavity cell profile was designed by SLAC and UCLA, optimized for maximal shunt impedance and minimal peak magnitude of the electric and magnetic field. The pi-mode accelerating fields are established in the cells with power coupled into each cell individually through the slot on the sidewall, and the peak electric field magnitude has been tuned to be equal in the two cells. The coupling waveguide network was designed to achieve critical coupling into the port of the input power waveguide and to achieve the desired power distribution. The cavity design has been completed for initial high-gradient test at room temperature.

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Footnotes

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Yes

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