

C-band high gradient cryogenic photoinjector research at UCLA

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There is a high demand for usage of the bright coherent X-ray. However, its availability is very limited because the facility becomes very large, such as LCLS. UCLA is proposing a compact light source termed the UC-XFEL where the facility is designed to be less than 40-m long. For its realization, a the creation of a beam with extremely high 6D brightness is critically important. We adopted the technology of the C-band cryogenic normal conducting cavities for reaching very high (250 MV/m peak) electric fields and attendant high brightness electron beam production. We are designing a high gradient RF gun to produce a high brightness beam, and are employing the distributed coupling scheme designed at first SLAC at cryogenic temperature. We have started preparing for the basic experiments on the cryogenic injector. A half-cell C-band gun is designed and being constructed for the study of the cathode properties at the cryogenic temperature. We review these activities in the light of ongoing general research in experimentally exploring cryogenic C-band RF properties.

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