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A New Technology for High Gradient Radiofrequency Photogun

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High gradient RF photoguns have been a key development to enable several applications of high quality electron beams. They allow the generation of beams with very high peak current and low transverse emittance, satisfying the tight demands for FELs, ERLs, Compton/Thomson Sources and high-energy linear colliders. In the present paper we present the design of a new RF photogun recently developed for the SPARC photoinjector at LNF and for the ELI-NP photoinjector. This design implements several new features from the electromagnetic point of view and, more important, a novel technology for its realization that does not involve any brazing process. This strongly reduces the cost, the realization time and the risk of failure. Details on the electromagnetic design and low power RF measurements are presented. Results of the high power test performed in two different facilities are also presented.

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