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Output of a Josephson stimulated terahertz amplified radiation emitter[1] RICHARD KLEMM, University of Central Florida, KAZUO KADOWAKI, University of Tsukuba, Tsukuba, Japan — The angular dependence of the radiation-zone output power and electric polarization of the stimulated terahertz amplified radiation (STAR) emitted from a *dc* voltage applied across cylindrical and rectangular stacks of intrinsic Josephson junctions is calculated. During coherent emission, a spatially uniform *ac* Josephson current density in the stack acts as a surface electric current density antenna source, leading to an harmonic radiation frequency spectrum, as in experiment, but absent in all cavity models of cylindrical mesas. Spatial fluctuations of the *ac* Josephson current cause its fundamental mode to lock onto the lowest finite energy cylindrical cavity mode, causing it to resonate, leading to a non-uniform magnetic surface current density radiation source, and a non-trivial combined fundamental frequency output power with linear polarization for general radiation directions. Existing $Bi_2Sr_2CaCu_2O_{8+\delta}$ crystals atop perfect electric conductors could have STAR emitter power in excess of 5 mW, acceptable for many device applications.

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