

Full Synchronization of Arrays of High- T_c Josephson Junctions

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Abstract - We explored high-temperature superconductor Josephson junction arrays embedded in a hemispherical Fabry-Perot resonator. We compared the characteristics of three designs of arrays to achieve steps at higher voltage with a better coupling to the millimeter wave irradiation power. With an optimal design, we achieved a maximum Josephson voltage of about 0.1V for an array of 620 bicrystal junctions at a temperature of 79.2K and a frequency of 77.465 GHz. Also steps from 0.01 V up to 0.1 V were observed. Our results showed that such circuits are promising for applications in quantum voltage metrology. It is important to note that our quasioptical coupling method can be extended up to terahertz frequencies.

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