

Abstract Submitted
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Synchronization by internal cavity mode and resonant electromagnetic emission from intrinsic Josephson junction stacks¹ ALEXEI KOSHELEV², Argonne National Laboratory — Intrinsic Josephson-junction stacks realized in mesas fabricated out of high- T_c superconductors may be used as sources of coherent electromagnetic radiation. The major challenge is to synchronize Josephson oscillations in all junctions to get significant radiation. A simple way to solve this problem is to excite the in-phase Fiske mode when the Josephson frequency matches the Fiske-resonance frequency set by the stack lateral size[1]. A finite direct coupling to such mode exists in mesas with lateral modulation of the Josephson critical current identical in all junctions [2]. The powerful almost standing electromagnetic wave is excited inside the crystal in the resonance promoting full synchronization. We evaluate behavior of the I-V characteristics and radiated power near the resonance. We will discuss several relevant issues including (i) stability of the coherent state, (ii) mechanism of damping including external radiation and leaking of radiation into the bulk crystal, and (iii) angular dependence of external radiation. [1]L. Ozyuzer, *et al.* Science **318**, 1291 (2007) [2]A. E. Koshelev and L. N. Bulaevskii, cond-mat 0708.3269

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