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Surface effects in THz wave emission from intrinsic Josephson junctions YOSHIHIKO NONOMURA, Computational Materials Science Center, National Institute for Materials Science, Tsukuba, Ibaraki 305-0047, Japan — Recently THz wave emission from intrinsic Josephson junctions without external fields [1] was observed experimentally. As possible states to characterize this emission, the McCumber-like state with little spatial dependence of electric fields (for the surface impedance $Z = 1$) [2] and novel phase-kink state (for large and complex Z) [3] have been proposed. In the present study [4] it is numerically shown that both states are stationary and that the dynamical phase transition between these two states occurs as Z is varied. The McCumber-like state is stable for low current and small Z. For higher current, the phase-kink state accompanied with symmetry breaking along the c axis is stable even for $Z = 1$, though strong emission in the vicinity of cavity resonance points only takes place for larger Z. Value of Z is optimized for the strongest emission, and effect of surface roughness will also be discussed. [1] L. Ozyuzer *et al.*, Science **318**, 1291 (2007); K. Kadowaki *et al.*, Physica C **468**, 634 (2008). [2] H. Matsumoto *et al.*, Physica C **468**, 654, 1899 (2008). [3] S. Lin and X. Hu, Phys. Rev. Lett. **100**, 247006 (2008). [4] Y. Nonomura, arXiv:0810.3756.

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