Abstract for an Invited Paper
for the MAR13 Meeting of
the American Physical Society

Hot Spot and THz Wave Generation in Bi$_2$Sr$_2$CaCu$_2$O$_8$ Intrinsic Josephson Junction Stacks
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Stacks of intrinsic Josephson junctions made of the high temperature superconductor Bi$_2$Sr$_2$CaCu$_2$O$_8$ have been shown to emit coherent radiation at THz frequencies [1]. Emission is observed both in a low bias regime and a high bias regime. While at low bias the temperature of the stack is close to the bath temperature, at high bias a hot spot and a standing wave, formed in the "cold" part of the stack, coexist [2-5]. THz radiation is very stable in this regime, exhibiting a linewidth which is much smaller than expected from a purely cavity-induced synchronization mechanism [6]. We investigate the interaction of hot spots and THz waves using a combination of transport measurement, direct electromagnetic wave detection and low temperature scanning laser microscopy (LTSLM). In this talk recent developments will be presented, with a focus on the mechanism of hot spot formation.
