

Subject: Kadowaki colloquium, 3/23, 11am, 212, Rm A-157
From: Janice Coble <coble@msd.anl.gov>
Date: Tue, 14 Mar 2006 08:47:46 -0600
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SPEAKER: Dr. KAZUO KADOWAKI
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TITLE: Josephson Vortices and their
Dynamical Nature in Mesoscopic
Bi₂Sr₂CaCu₂O_{8+d} Intrinsic Junctions

DATE: Thursday, March 23, 2006
TIME: 11:00 a.m.
PLACE: Building 212, Room A157

HOST: Wai Kwok

Refreshments will be served at 10:45 a.m.

Abstract: The vortex state in highly anisotropic layered superconductor Bi₂Sr₂CaCu₂O_{8+d} has long been studied both theoretically and experimentally. In a tilted magnetic field it has been established that the crossing lattice state appears to form near the field being parallel to the ab-plane. In a bulk sample the Josephson vortex state is only observed within a lock-in angle, which is known to be a very narrow angle $\approx 0.01^\circ$ near the ab-plane, so that this restriction imposes a strong hurdle on measurements, making experiments extremely difficult. On the other hand, this difficulty is resolved in a mesoscopic size of sample (a few to 10 μ m) micro engineered by FIB, because this narrow lock-in angle opens widely, being inversely proportional to the magnetic field intensity H and the square root of the sample size. This allows us to study the properties of the Josephson vortex state in a multistacked intrinsic Josephson system, which has never been explored before in detail.

I will present the results of our recent work on the static and dynamical nature of the Josephson vortices in a mesoscopic size of the intrinsic Josephson junctions system Bi₂Sr₂CaCu₂O_{8+d} with emphasis on the following 3 points:

1. Properties of the dynamical flow resistance of Josephson vortices
2. Fiske resonance modes and the implication
3. Josephson plasma excitations by a swift jittering Josephson vortex flow.