# Site-sensitive study of the dynamics of driven vortices in Bi2212

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## Abstract

By a local-magnetic-field-noise measurement with a 2DEG micro Hall probe array, dynamics of the current-driven vortices was investigated around the vortex phase transition field $H_m$ in Bi2212. Our new method has at least two advantages over a conventional voltage-noise measurement: higher sensitivity and high spatial resolution $\sim \mu m$. These made possible site-sensitive noise measurement in high temperatures. First of all, we found two kinds of noises: broadband noise(BBN) and narrowband noise(NBN). These were found only in the region where the resistivity appeared. At larger currents, it sits *below* $H_m$, while at smaller ones, it is *above* $H_m$. Thus, the noises are rather independent of the vortex phase. By a more detailed investigation, it became clear that the BBN and the NBN have different properties, listed as follows:

(1) The frequency of NBN was scaled with "transit frequency" of the vortices.

(2) NBN was influenced by the current direction, whereas BBN was not.

(3) NBN has a large space correlation along the vortex flow direction, whereas BBN does not.

(4) BBN on each site has a characteristic spectral shape.

From these results, we infer that NBN is generated by a macroscopic barrier, such as surface barrier. On the other hand, BBN seems generated by local specific patterns of pinning centers. "Plastic flow" should be the most possible origin of the BBN.