

## Simple Calibration Free Method to Measure AC Magnetic Moment and Losses

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**Abstract** - A calibration-free method to measure components of ac magnetic moment vector in a transverse ac magnetic field have been developed. This method is intended for studies of the ac vector magnetization and losses in HTS tapes, wires and long slabs at low temperatures. The method is suitable for measurement of samples carrying transport current. The advantages of the method, besides its vector character, are an extremely compact ac field excitation coil and the pick-up coil positioned outside of the excitation coil. Finite dimensions of the sample and of pick-up coils are taken into account. To illustrate the potential of the method, measurements of Bi2223/Ag tapes at 77 K were performed. The ac field amplitude 2 to 100 mT, the frequencies 20 to 230 Hz and various orientations of the ac field transverse to the sample plane were used. The dc magnetization and hysteresis losses of the samples were also measured. The observed dependence of the ac magnetic moment on the angle between the ac field direction and the superconductor plane is consistent with the conception of the "Geometrical locking of the irreversible magnetic moment to the normal of a thin-plate super-conductor" (A.A. Zhukov et al. 1997 *Phys. Rev. B* 56 2809-2819).

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