Development of Ultrasensitive Nanomagnetic Sensors

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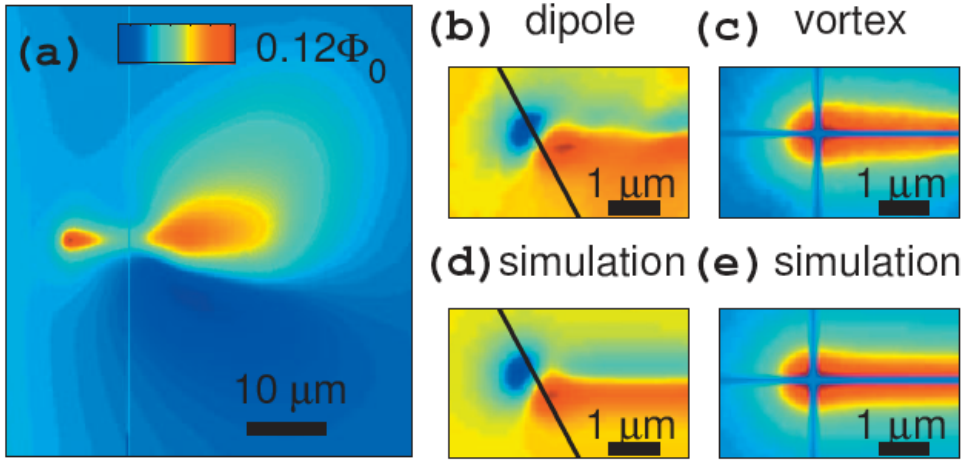
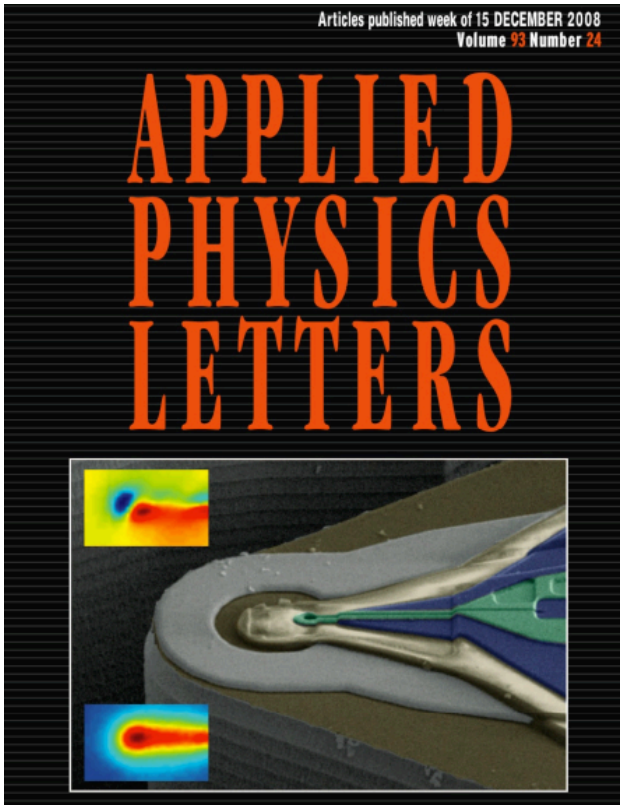
New nanoscale Superconducting Quantum Interference Devices, called "nano-SQUIDs", can detect the magnetic moment produced by a nanoparticle with only 100 electron spins. They are 10,000,000,000 times more sensitive than commercially available research tools. The sensors pickup loops, ranging in diameter between 600 nm – 2 um, are defined by focused ion beam and are integrated into a 12-layer optical lithography process allowing flux-locked feedback, in situ background subtraction and optimized flux noise.



Top: a) Device's magnetometry response near an isolated superconducting vortex.b-e) Flux recorded from an isolated dipole and monopole field source matches well with model data.

Right: View of the fabricated pickup loop from the Applied Physics Letters cover image.



REFERENCE:
N. Koshnick, M. Huber, J. Bert, C. Hicks, J. Large, H. Edwards, K. Moler
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