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Improved trapping and transport of cold atoms for magnetic microscopy AMRUTA GADGE, T. JAMES, X. LI, University of Nottingham, BO LU, Chinese University of Hong Kong, N. GARRIDOGONZALEZ, A. FINKE, C. MELLOR, M. FROMHOLD, University of Nottingham, C. KOLLER, Mirco and Nano systems FH,Austria, F. ORUCEVIC, PETER KRUGER, University of Nottingham — Using cold atoms, a very sensitive and high resolution magnetic and electric field sensor can be realised. Ultra-close trapping of atoms would improve the resolution of cold-atom based surface probes. The limitation on the trapping distance arises from strongly distance-dependent effects such as Casimir force, Johnson noise etc. We are constructing an experimental system to trap atoms at surface separations of less than a micron. We will demonstrate the possibility of using special surfaces such as silicon nitride membranes and graphene for sub-micron trapping. We have designed a 10-layer printed circuit board, which can magnetically trap the cold atom cloud and transport it precisely to a desired location. This gives us the ability to study multiple samples within the same vacuum environment. In order to achieve higher atom number in the initial trapping stages, we use a dual-color MOT technique for Rb-87 atoms. Using this technique we achieve a significant increase in atom number and decrease in temperature. In this talk, I will present the results of the dual color MOT. I will also report on results related to magnetic transport and sub-micron trapping of atoms.

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