

Abstract Submitted
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Towards electrons floating over diamond¹ M.P. RAY, J.W. BALDWIN, M.K. ZALALUTDINOV, J.L. SHAW, J.E. BUTLER, B.B. PATE, Naval Research Laboratory, T.I. FEYGELSON, SAIC Inc. — The opportunities for development of a 2D electron system of image potential surface electrons over negative electron affinity diamond are examined. Image potential surface electron states, located spatially outside the solid, are well established on a variety of surfaces (metals, semiconductors and dielectrics). In particular, laterally confined electrons above liquid helium have been demonstrated and proposed for advanced computing applications [1,2]. Unlike the surface of liquid helium, the electron affinity of the diamond surface can be varied [3], providing the ability to lithographically pattern surface electron ‘pools’ and ‘wires’. We present candidate structures for lateral charge control that make use of buried and surface features patterned in and on diamond. Electronic properties and spectroscopy of electrons over diamond in our fabricated structures are discussed.

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