

Abstract Submitted
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Surface diffusion of a carbon-atom on Au(110) surfaces¹ E. KIM, Univ of Nevada - Las Vegas, A. SAFAVI-NAINI, JILA, D.A. HITE, K.S. MCKAY, D.P. PAPPAS, NIST, P.F. WECK, Sandia National Laboratories, H.R. SADEGH-POUR, ITAMP, Harvard-Smithsonian — We have investigated the surface diffusion of carbon-atom on gold surfaces using density functional theory and detailed scanning probe microscopy. The decoherence of trapped-ion quantum gates due to heating of their motional modes is a fundamental science and engineering problem. In an effort to understand heating at the trap-electrode surfaces, we investigate the possible source of noise by focusing on the diffusion of carbon-containing adsorbates onto the Au(110) surface. In this study, we show how the diffusive motion of carbon atom on gold surface significantly affects the energy landscape and adatom dipole moment variation. A simple model for the diffusion noise, which varies quadratically with the variation of the dipole moment, qualitatively reproduces the measured noise spectrum, and the estimate of the noise spectral density is in accord with measured values.

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