

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

An ab-initio model of anomalous heating in planar ion traps ARGHAVAN SAFAVI-NAINI, MIT/ITAMP, PETER RABL, Innsbruck, PHILIPPE WECK, UNLV, HOSSEIN SADEGHPOUR, ITAMP — Measurements of the electric field noise present in ion traps indicate that the noise-induced heating scales as the inverse fourth power of the distance from the trap electrodes to the ion and its spectral density scales with the inverse of frequency [1]. These measurements also suggest that some thermally activated random process is at work. In this work, we present an ab-initio model that accounts for the noise due to oscillating dipoles on the trap electrode surface. The dipoles are formed when atoms are adsorbed on the trap surface, whose interaction with the surface is described using DFT. The oscillations are both in the alignment of the dipoles as well as their size. Calculations for the spectral noise density, distance, frequency and temperature dependencies are presented.

[1] Q. A. Turchette et. al., Phys. Rev. A. **61**, 63418 (2000)

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Date submitted: 01 Feb 2011

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