# Adsorbate dynamics on a silica-coated gold surface measured by Rydberg Stark spectroscopy

Thu, 2016-03-10 16:47 - shimon machluf [1] **Date:** 2016-04-18
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**Reference:**
Journal of Physics B: Atomic, Molecular and Optical Physics, Volume 49, Number 9

**URL:**
http://stacks.iop.org/0953-4075/49/i=9/a=094005 [2]

Trapping a Rydberg atom close to a surface is an important step towards the realisation of many proposals of quantum information or hybrid quantum systems. One of the challenges in these experiments is to overcome the electric field emanating from contaminations on the surface. Here we report on measurements of an electric field created by 87Rb atoms absorbed on a 25nm thick layer of SiO2, covering a 90nm layer of Au. The electric field is measured using a two-photon transition to the 23D5/2 and 25S1/2 state. The electric field value that we measure is higher than typical values measured above metal surfaces, but is consistent with other measurements above SiO2 surfaces. In addition, we measure the temporal behaviour of the field and observe that we can reduce it in a single experimental cycle, using UV light or by mildly heating the surface, whereas the buildup of the field takes thousands of cycles. We explain these results by a change in the ad-atoms distribution on the surface. These results indicate that the stray electric field can be reduced, opening new possibilities for experiments with trapped Rydberg atoms near surfaces.

- RySQ [3]
- 18.30.+a Atoms close to surfaces/in laser fields or cavities [4]
- Result [5]
- 15.10.Ry Rydberg atoms [6]

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