

Abstract Submitted
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Probing Atom-Surface Interactions Using Rb Rydberg Atoms

JONATHON SEDLACEK, University of Oklahoma, HARALD KÜBLER, 5. Physikalisches Institut, Universität Stuttgart, CHARLES EWEL, JAMES SHAFER, University of Oklahoma — Alkali Rydberg atoms close to a dielectric surface can resonantly excite surface phonon-polaritons, by decaying into a nearby Rydberg state. In our experiment, rubidium atoms are trapped in a mirror-MOT and are brought close to a dielectric surface in a magnetic trap, where Rydberg excitation takes place. We are exploring the controlled coupling of Rydberg atoms to surfaces such as quartz, LaF_3 , and PPLN. Engineered materials such as PPLN allow for control over surface phonon-polariton resonance frequencies and bandwidths, enabling increased coupling strength. Engineering the surface allows for coupling to surface phonon-polaritons at much greater distances.

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