Measurement of the angular dependence of the dipole-dipole interaction between two individual Rydberg atoms at a Förster resonance

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http://dx.doi.org/10.1103/PhysRevA.92.020701 [2]

We measure the angular dependence of the resonant dipole-dipole interaction between two individual Rydberg atoms with controlled relative positions. By applying a combination of static electric and magnetic fields on the atoms, we demonstrate the possibility to isolate a single interaction channel at a Förster resonance, that shows a well-defined angular dependence. We first identify spectroscopically the Förster resonance of choice and we then perform a direct measurement of the interaction strength between the two atoms as a function of the angle between the internuclear axis and the quantization axis. Our results show good agreement with the angular dependence ~(1-3 cos2(theta) expected for this resonance. Understanding in detail the angular dependence of resonant interactions is important in view of using Förster resonances for quantum state engineering with Rydberg atoms.

- RySQ [3]
- Result [4]
- 15.10.Ry Rydberg atoms [5]

Links:
[1] http://qurope.eu/users/marccheneau
[2] http://dx.doi.org/10.1103/PhysRevA.92.020701
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