

## Quantum Physics

# Intensity-field correlation of single-atom resonance fluorescence

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We report measurements of an intensity-field correlation function of the resonance fluorescence of a single trapped Ba<sup>+</sup> ion. Detection of a photon prepares the atom in its ground state and we observe its subsequent evolution under interaction with a laser field of well defined phase. We record the regression of the resonance fluorescence source field. This provides a direct measurement of the field of the radiating dipole of a single atom and exhibits its strong non-classical behavior. In the experimental setup an interference measurement is conditioned on a fluorescence photon detection. The third-order correlation function thus recorded demonstrates an aspect of wave-particle duality at the single-atom, single-photon level.

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## Submission history

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