SFB/TRR 21 - Seminar

20. November 2015, Stuttgart

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Rydberg atoms in strong external fields: Part 2

The response of atomic quantum systems to external fields is of interest both in field-sensing applications and in fundamental physics. Due to their weak atomic binding, highly excited Rydberg atoms exhibit a particularly strong response to perturbations, such as external RF and magnetic fields. Topics of current studies include the design of calibration-free sensors for electric and magnetic fields that are based on invariable atomic theory. From a fundamental-physics point of view, Rydberg atoms in strong RF or magnetic fields are of interest because their classical counterparts exhibit chaotic dynamics. Here, we employ electromagnetically-induced transparency to map Rydberg-level structures in strong microwave fields. A non-perturbative Floquet analysis is used to model the field-induced level-shifts, the state-mixing effects and the Floquet-state excitation strengths of the strongly driven system. Calculated Floquet spectra are employed to derive the microwave-field distribution present in the measurement volume.

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