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Mapping the composite character of magnetically trapped Rydberg atoms PETER SCHMELCHER, Physikalisches Institut, University of Heidelberg, MICHAEL MAYLE, Theoretische Chemie, University of Heidelberg, IGOR LESANOVSKY, University of Nottingham — By investigating the quantum properties of magnetically trapped $nS_{1/2}$ Rydberg atoms, it is demonstrated that the composite nature of Rydberg atoms significantly alters their trapping properties opposed to point-like particles with identical magnetic moment. Employing an off-resonant two photon coupling scheme, a setup is proposed which allows to observe the signatures of the rydberg trapping potential using a gas of ground state atoms. In addition, such a scheme provides new possibilities for designing trapping potentials for ground state atoms. Simulated time-of-flight pictures mirroring the experimental situation are provided.

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