University of Stuttgart
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iRyd

SPP 1929 – Seminar

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Universität Stuttgart
NWZ II, Raum 3.123
Pfaffenwaldring 57, 70569 Stuttgart

Christian Fey
(Universität Hamburg)

Spin couplings in ultralong-range Rydberg molecules: Two applications.

In my talk I'm going to present two of our recent projects on ultralong-range Rydberg molecules (bound states between a Rydberg atom and one or more ground state atoms)[1,2]. In the first project we investigate the alignment of diatomic d-state Rydberg molecules in magnetic fields with a special focus on the role of spin-couplings [3,4]. These couplings include the hyperfine structure of the ground state atom, the fine structure of the Rydberg atom as well as spin-dependent interactions between the Rydberg electron and the ground state atoms (singlet vs. triplet scattering).
The second project is about field-free triatomic d-state Rydberg molecules. To compare our theoretical predictions with experimental spectra we take into account spin-couplings also for this system.

[1] C. H. Greene, A. S. Dickinson, H. R. Sadeghpour, Phys. Rev. Lett. 85, 2458 (2000).
[2] V. Bendkowsky, B. Butscher, J. Nipper, J. P. Shaffer, R. Löw, T. Pfau, Nature 458, 1005 (2009).
[3] A. T. Krupp, A. Gaj, J. B. Balewski, P. Ilzhöfer, S. Hofferberth, R. Löw, T. Pfau, M. Kurz, P. Schmelcher, Phys. Rev. Lett. 112, 143008 (2014).
[4] F. Hummel, C. Fey, P. Schmelcher, arxiv 1711.08748 (2017).