

IRTG-Seminar



Dr. Michal Tomza

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“Interactions and collisional dynamics in cold ion-atom systems”

Hybrid systems of laser-cooled trapped ions and ultracold atoms combined in a single experimental setup have recently emerged as a new platform for fundamental research in quantum physics [1]. Reaching ultracold s-wave quantum regime is one of the most important challenges in this field at the moment. I will discuss possible solutions to this problem by using ion-atom mixtures with the large ion/atom mass ratio [2] as well as using a specific type of homonuclear S-state Rydberg molecules with a small reduced mass to initialize and control ion-atom scattering events [3]. I will present how ab initio quantum chemistry calculations can support and guide quantum physics experiments. If time allows, I will present our theoretical proposals of novel systems for cold ion-atom experiments using ions or atoms other than alkali-metal or alkaline-earth-metal ones.

[1] M. Tomza, K. Jachymski, R. Gerritsma, A. Negretti, T. Calarco, Z. Idziaszek, P. S. Julienne, arXiv:1708.07832, (2017)

[2] J. Joger, H. Furst, N. Ewald, T. Feldker, M. Tomza, R. Gerritsma, Phys. Rev. A 96, 030703(R) (2017)

[3] T. Schmid, C. Veit, N. Zuber, R. Löw, T. Pfau, M. Tarana, M. Tomza, Phys. Rev. Lett. 120, 153401 (2018)

Wednesday, June 20, 2018; 12:15 p.m.

The foyer on the 4th floor, Gustav-Mie-Haus

Hermann-Herder-Str. 3a