

## CONDENSED MATTER THEORY SEMINAR

Subject: **Quantum many-body dynamics of driven-dissipative Rydberg gases**

Speaker: **Dr. Hendrik Weimer (Leibniz Universität Hannover)**

Date & time: **Friday, February 9<sup>th</sup>, 2018 at 3.15 p.m.**

Venue: **Seminar room 1.114**

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Ultracold Rydberg atoms provide an ideal testbed for study the interplay between strong coherent interactions and dissipative processes, a subject that has recently seen great attention following the discovery of dissipative state engineering for tailored many-body quantum states. However, in contrast to their fully coherent counterparts, our insights into dissipative many-body dynamics are still in its infancy. I will present the first steps towards a deeper understanding of driven-dissipative Rydberg gases based on a recently developed variational principle [1] as well as numerical simulations based on tensor network operators [2]. Specifically, I will investigate phase transitions of the steady state, including the presence of a multicritical point that is triggered by the dissipation within the system [3].

### References

[1] H. Weimer, Phys. Rev. Lett. **114**, 040402 (2015)

[2] A. Kshetrimayum, H. Weimer, R. Orus, Nature Commun. **8**, 1291 (2017).

[3] V. R. Overbeck, M. F. Maghrebi, A. V. Gorshkov, H. Weimer, Phys. Rev. A **95**, 042133 (2017)