

Invitation to IQST Seminar
on Friday, August 10th, 2018, 9:00 am
University of Stuttgart, Campus Vaihingen,
Pfaffenwaldring 57 (NWZ II),
Room 3.123

**Title: Using fractional quantum Hall states
to enhance polariton-polariton interactions**



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Abstract: We show experiments on a two-dimensional electron system (2DES) embedded in an optical cavity, where coupling of photons to Fermi polarons leads, in the strong coupling regime, to the formation of polaron polaritons [1,2]. Under an external magnetic field, the cavity polaron coupling depends on the 2DES filling factor, leading to nonlinear energy shifts of the polariton lines around quantum Hall states [2,3]. We investigate potential applications of these energy shifts for nonlinear quantum optics. We measure the time-resolved nonlinear response of the system, and demonstrate enhanced polariton-polariton interactions around fractional quantum Hall states. At filling factor $2/5$, interactions are increased by more than an order of magnitude.

References

- [1] S. Ravets, et al., Phys. Rev. Lett. 120, 057401 (2018)
- [2] M. Sidler, et al., Nature Phys. 13, 255 (2017)
- [3] S. Smolka, et al., Science 346, 332 (2014)