Microwave-shielding and cooling of ultracold dipolar NaCs molecules

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We have recently demonstrated microwave shielding and evaporative cooling for bosonic NaCs ground state molecules [1,2]. Dressing the molecules with a circularly polarized microwave field, we observe a suppression of inelastic loss by a factor of 200 and reach lifetimes of 1 second in dense molecular ensembles. We have demonstrated evaporative cooling for bosonic molecules and reached a phase-space density of 0.1 on the verge of BEC [3].

I will share our latest insights on the collisional properties of this strongly dipolar system and report on the current status of cooling. NaCs offers exciting scientific prospects for many-body physics both in the classical and the quantum regime.

[2] Stevenson, et al., Ultracold gas of dipolar NaCs ground state molecules, PRL 130, 113003 (2023)