

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.

[1] Warner, et al., Overlapping Bose-Einstein condensates of Na and Cs, PRA 104, 033302 (2021)

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

[3] Bigagli, et al., Collisionally stable gas of bosonic dipolar ground state molecules, arXiv:2303.16845 (2023)

Primary author: WILL, Sebastian (Columbia University)

Co-authors: Dr STEVENSON, Ian (Columbia University); Mr BIGAGLI, Niccolo (Columbia University); Mrs WARNER, Claire (Columbia University); Mr YUAN, Weijun (Columbia University); Mr ZHANG, Siwei (Columbia University)

Presenter: WILL, Sebastian (Columbia University)

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