

Double Microwave Shielding

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I will present double microwave shielding, which has recently enabled evaporative cooling to the first Bose-Einstein condensate of polar molecules [Bigagli et al., Nature 631, 289 (2024)]. Two microwave fields of different frequency and polarization are employed to effectively shield polar molecules from inelastic collisions and three-body recombination. Double microwave shielding effectively suppresses two- and three-body losses. Simultaneously, dipolar interactions and the scattering length can be flexibly tuned, enabling comprehensive control over interactions in ultracold gases of polar molecules. This approach works universally for a wide range of molecules. This opens the door to studying many-body physics with strongly interacting dipolar quantum matter.

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