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Two photon optical shielding of collisions between ultracold polar molecules

We propose a method to engineer repulsive long-range interactions between ultracold ground-state molecules using optical fields, thus preventing short-range collisional losses. It maps the microwave coupling recently used for collisional shielding onto a two-photon transition, and takes advantage of optical control techniques. In contrast to the previously proposed one-photon optical shielding [Phys. Rev. Lett. 125, 153202 (2020)], this scheme avoids heating of the molecular gas due to photon scattering. The proposed protocol, exemplified for $^{23}\text{Na}^{39}\text{K}$, should be applicable to a large class of polar diatomic molecules.

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