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**Reducing photoassociation and light assisted collisions in tightly confined geometries** ALBAN URVOY, JIAZHONG HU, ZACHARY VENDEIRO, WENLAN CHEN, VLADAN VULETIC, Massachusetts Institute of Technology — Light-induced binary loss mechanisms have dramatic consequences for the manipulation of cold atoms with light fields, limiting the performance of optical cooling schemes at high atomic densities, as well as the in-situ observation of atoms in quantum gas microscopes.

Here we present our results on several methods for reducing such loss mechanisms for atoms tightly confined in optical lattices. First we show that using light that is far detuned to the red of the atomic transition significantly reduces light-induced binary losses, as predicted by theory. Then we discuss how these loss mechanisms are modified by light scattering effects in low dimension and tightly-confined gases, based on our observation of anomalously low light-induced loss rates.

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