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Magnetically-trapped molecules efficiently loaded from a molecular MOT[1] MATTHEW STEINECKER, Yale University, DANIEL MCCARRON, University of Connecticut, YUQI ZHU, DAVID DEMILLE, Yale University — Due to the rich level structures of diatomic molecules, ultracold molecular gases will enable a wide range of experiments in ultracold chemistry, precision measurement, and quantum simulation. However, this same structure poses challenges in laser cooling and trapping of molecules [1,2]. We demonstrate the efficient transfer of molecules from a magneto-optical trap (MOT) into a conservative magnetic quadrupole trap [3]. Our scheme begins with a blue-detuned optical molasses to cool SrF molecules to ~ 50 μK. Next, we optically pump the molecules into a strongly-trapped sublevel. This two-step process reliably transfers 64% of the molecules initially trapped in the MOT into the magnetic trap, comparable to similar atomic experiments. Once loaded, the magnetic trap is compressed by increasing the magnetic field gradient. We observe a magnetic trap lifetime of over 1 s. This opens a promising new path to study ultracold molecular collisions, and potentially to produce quantum-degenerate molecular gases. [1] J. F. Barry *et al.*, *Nature* **512**, 286–289 (2014). [2] E. B. Norrgard *et al.*, *Phys. Rev. Lett.* **116**, 063004 (2016). [3] D. J. McCarron *et al.*, *arXiv:*1712.01462.

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