Zero-Temperature Theory of Collisionless Rapid Adiabatic Passage from a Fermi Degenerate Gas of Atoms to a Bose-Einstein Condensate of Molecules MATT MACKIE[1], Department of Physics and Astronomy, Temple University, Philadelphia, PA 19122, OLAVI DANNENBERG, Helsinki Institute of Physics, PL 64, FIN-00014 Helsingin yliopisto, Finland — We theoretically examine a zero-temperature system of Fermi degenerate atoms coupled to bosonic molecules via collisionless rapid adiabatic passage across a Feshbach resonance, focusing on saturation of the molecular conversion efficiency at the slowest magnetic-field sweep rates. Borrowing a novel *many-fermion* Fock-state theory, we find that a proper model of the magnetic-field sweep can systematically remove saturation. We also debunk the common misconception that many-body effects are responsible for molecules existing above the two-body threshold.

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