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Vibrational energy transfer in ultracold molecule-molecule collisions[1] GOULVEN QUÉMÉNER, BALAKRISHNAN NADUVALATH, University of Nevada Las Vegas, ROMAN KREMS, University of British Columbia — The success in creating Bose-Einstein condensates of molecules has spurred much interest in atom-molecule and molecule-molecule collisions at cold and ultracold temperatures. We present here a rigorous study of vibrational relaxation in H_2 + H_2 collisions at cold and ultracold temperatures and identify an efficient mechanism of ro-vibrational energy transfer [1]. If the colliding molecules are in different rotational and vibrational levels, the internal energy may be transferred between the molecules through an extremely state-selective process involving simultaneous conservation of internal energy and total rotational angular momentum. The same transition in collisions of distinguishable molecules corresponds to the rotational energy transfer from one vibrational state of the colliding molecules to another.

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