Abstract Submitted
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Ultracold collisions between atoms and molecules in high vibrational states: effect of the atom-atom scattering length GOULVEN QUÉMÉNER, Department Of Chemistry, University of Nevada Las Vegas, Las Vegas, NV 89154, PASCAL HONVAULT, Laboratoire de Physique Moleculaire, Universite de Franche–Comte, Besancon, France, JEAN-MICHEL LAUNAY, Laboratoire PALMS, Universite de Rennes 1, Rennes, France — Recently, Bose-Einstein condensates of $^6Li_2$ and $^{40}K_2$ molecules have been produced using Feshbach resonances and Pauli blocking mechanism. In these experiments, molecules are formed in the highest vibrational state and composed by fermionic atoms, and the atom-atom scattering length is large and positive. Up to now, a few quantum-mechanical studies of molecular collisions in the ultralow energy range have been published [1]. Using a quantum-mechanical formalism based on hyperspherical coordinates, we have obtained elastic and inelastic rates coefficients for the fermionic system ^6Li + $^6Li_2$ and for the bosonic systems ^7Li + $^7Li_2$ and Na + Na_2 when the molecule is in a high vibrational state. We will also explain the Pauli blocking mechanism that occurs in the experiments, by comparing rates coefficients for a system composed of bosonic or fermionic atoms when the diatom is in the last vibrational state or not and when the atom-atom scattering length is increasing. [1] G. Quéméner, P. Honvault, J.-M. Launay, P. Soldá n, D. E. Potter, J. M. Hutson, *Phys. Rev. A* **71**, 032722 (2005), and references therein

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