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Título: Conjectures about the separability of atoms and molecules

Resumo: Atoms and molecules are particular kinds of restricted n-body systems, which generally behave as quasi-separable, unlike other n-body systems, e.g., Newtonian ones. The Coulomb repulsion and the Pauli exclusion principle in atoms and molecules are responsible for that separability. Additionally, chemical bonds, especially covalent bonds, enhance the separability of molecules. In this way, the stable states of atoms and molecules can be described by effective potentials. We discuss the physical and chemical nature of atoms and molecules, comparing the degrees of separability between different systems. For example, the separability of Newtonian systems is generally possible in particular classes of restricted systems due to relative mass differences. However, for atoms and molecules, the separability is much broader.

In summary, we place atomic and molecular systems in the context of four fundamental forces and discuss these systems' particularities in correlation motion. The attractive and repulsive components of electromagnetic force confer the main particularities of atoms and molecules. The attractive component allows the chemical bond between two self-repulsive sets of charges and mainly neutralizes this force, avoiding collapse by charge concentration. The repulsive component allows the quasi-separability of atoms and molecules, a low degree of internal correlation motion, and also avoids the collapse of matter.