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Electro-association of two ultracold dipolar molecules into a tetramer

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We explore the possibility of electro-association of two ultracold dipolar molecules into a long-range tetramer state, called a “field linked state”. These particular states have been predicted in 2003 [1] in a static electric field and more recently in a microwave [2]. Such states have been confirmed by a recent experiment [3] in the resonances of ultracold molecular scattering.

We discuss the experimental feasibility of the process in terms of the adequate electric field ramp of a microwave to apply, different decay lifetimes, and in terms of the initial population starting with either thermal or quantum degenerate gases. The process shares a lot in common with magneto-association for which one can associate two ultracold atoms into a long-range diatomic molecule using a ramp of magnetic field [4]. This can be a primary step to form ground-state tetramers [5].

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Affiliation de l’auteur principal

Laboratoire Aimé Cotton, CNRS, Université Paris-Saclay

Auteurs principaux: QUÉMÉNER, Goulven (Laboratoire Aimé Cotton, CNRS, Université Paris-Saclay); QUEMENER, Goulven (CNRS)

Co-auteurs: BOHN, John L. (JILA, NIST, and Department of Physics, University of Colorado, Boulder); CROFT, James F. E. (The Dodd-Walls Centre for Photonic and Quantum Technologies, Department of Physics, University of Otago, Dunedin)

Orateur: QUEMENER, Goulven (CNRS)

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