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Cold chemistry of a single ion in highly dense media: from three-body recombination to molecular photodissociation JESÚS PÉREZ-RíOS, School of Natural Sciences and Technology, Universidad del Turabo, Gurabo, PR00778, USA, AMIR MOHAMMADI, ARTJOM KRÜKOW, JOHANNES HECKER DENSCHLAG, Institut für Quantenmaterie and Center for Integrated Quantum Science and Technology (IQ^{ST});Universität Ulm; 89069Ulm; Germany, HUMBERTO DA SILVA JR., OLIVIER DULIEU, Laboratoire Aimé Cotton, CNRS/Université Paris-Sud/ENS Cachan, Orsay Cedex, France — A single laser cooled Ba^+ ion is brought in contact with a dense ultracold cloud of Rb atoms held by a dipole trap, leading to molecular formation through three-body recombination. However, the presence of light opens up new and intriguing reaction pathways rendering unexpected reaction products. These novel products are theoretically explained as a consequence of a very efficient vibrational quenching mechanism followed by photodissociation of the molecular ion by the light coming from the atomic dipole trap. Our findings, both theoretical and experimental will help to understand the role of light in cold chemistry experiments and how it limits sympathetic cooling of molecular ions.

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