Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Formation of molecular ions by radiative association of cold trapped atoms and ions[1] OLIVIER DULIEU, HUMBERTO DA SILVA JR, MIREILLE AYMAR, MAURICE RAOULT, Laboratoire Aimé Cotton, CNRS, Université Paris-Sud, ENS Cachan — Radiative emission during cold collisions between trapped laser-cooled Rb atoms and alkaline-earth ions (Ca+, Sr+, Ba+) and Yb+ are studied theoretically, using accurate effective-core-potential based quantum chemistry calculations of potential energy curves and transition dipole moments of the related molecular ions. Radiative association of molecular ions is predicted to occur for all systems with a cross section two to ten times larger than the radiative charge transfer one. Partial and total rate constants are also calculated and compared to available experiments. Narrow shape resonances are expected, which could be detectable at low temperature with an experimental resolution at the limit of the present standards. Vibrational distributions show that the final molecular ions are not created in their ground state level.

[1]Supported by the Marie-Curie ITN "COMIQ: Cold Molecular Ions at the Quantum limit" of the EU (#607491).

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Date submitted: 30 Jan 2015 Electronic form version 1.4