Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Rovibrational dynamics of ultracold heteronuclear molecules with tunable dipole-dipole interactions[1] PHILIPPE PELLEGRINI, LAËTITIA BOMBLE, MICHÈLE DESOUTER-LECOMTE, Université de Paris Sud, Orsay (France) — Ultracold heteronuclear dimers have large permanent dipole moments and long-lived states that make them promising systems for quantum information processing. The implementation of logic gates using rovibrational levels often relies on the possibility of controlling the strong dipole-dipole interaction coupling neighboring molecules [1]. The stability of the encoded qubits under sudden variations of the dipole-dipole interaction if of particular importance for the realization of a practical quantum register with polar molecules. We present a theoretical study of the rovibrational dynamics of ultracold polar molecules when the interaction coupling them varies. Molecules with large dipole moments like NaCs are considered. The use of tunable interactions for scalable quantum computing will be discussed as well.

[1] E. Kuznetsova et al. Phys. Rev. A, 78, 012315 (2008)

[1]Supported by the Triangle de la Physique, Orsay (France).

Philippe Pellegrini
Université de Paris Sud, Orsay (France)

Date submitted: 21 Jan 2010 Electronic form version 1.4