Abstract Submitted for the DAMOP10 Meeting of The American Physical Society

Trapping and cooling of Sr+ ions: strings and large clouds QUENTIN GLORIEUX, ROMAIN DUBESSY, SAMUEL GUIBAL, LUCA GUIDONI, JEAN PIERRE LIKFORMAN, THOMAS COUDREAU, SEBASTIEN REMOVILLE, Laboratoire Materiaux et Phenomenes Quantiques - Univ. Paris Diderot-Paris 7 — Large and cold ion clouds are very promising media for quantum information processing and quantum memories [1,2]. We report on the trapping and laser cooling of large clouds of singly ionized strontium ions in a linear Paul trap. We describe our loading technique based on two-photon absorption of femtosecond pulses and compare it to electron-bombardment ionization. The sample are Doppler-cooled to form Coulomb crystals both in the few-ion regime and in the case of large clouds. Our setup is designed, in particular, to obtain optically dense clouds in the perspective of an ion-based quantum memory for continuous variables [2]. We present absorption measurements, that are consistent with the estimated number of ions present in the trap. These experiments open the way to the use of a large cold trapped-ion cloud for the realization of a long-lived quantum memory.

References

- [1] Herskind P et al., Appl. Phys. B 93 373 (2008)
- [2] Coudreau T et al., J. Phys. B: At. Mol. Opt. Phys. 40 413 (2007)

Quentin Glorieux Laboratoire Materiaux et Phenomenes Quantiques -Univ. Paris Diderot-Paris 7

Date submitted: 25 Mar 2010 Electronic form version 1.4