

TRAPSENSOR: ELECTRONIC COUPLING BETWEEN TWO IONS STORED IN DIFFERENT TRAPS

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The coupling of ions stored in different traps through the charges they induce in a common electrode was proposed in Ref. [1], but it has not been accomplished yet. The completion of such a system would be an outstanding technological breakthrough in quantum electronics and would pave the way for the implementation of hybrids systems for quantum information. A pioneer work using radiofrequency traps started at the UC Berkeley several years ago (see e.g. [2]). With the same technical objective, but now using 7-T Penning traps, and aiming at different application first [3], we started to build the TRAPSENSOR facility at the University of Granada in 2012. The first outstanding goal is to achieve energy transfer between Doppler-cooled ions ($\langle n \rangle \sim 1000$ phonons) stored in different traps [4]. In this contribution we will present the full facility, report on the status of this singular experiment, and will present the studies carried out and the on-going work with prospects to reach the single energy quanta exchange level ($\langle n \rangle = 0$).

[1] D. J. Heinzen and D. J. Wineland, Phys. Rev. A **42**, 2977 (1990).

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[3] D. Rodríguez, Appl. Phys. B **107**, 1031 (2012).

[4] J. M. Cornejo *et al.*, Int. J. Mass Spectrom. **410C**, 22 (2016).