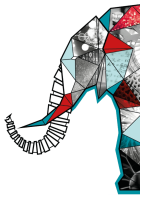
25e Congrès Général de la Société Française de Physique



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Phase transfer by a frequency comb for three-photon coherent population trapping

Monday, 8 July 2019 18:15 (15 minutes)

One of the applications of an optical frequency comb is the phase coherence transfer between lasers of very different wavelengths. In our experiment we use an offset-free optical frequency comb to reduce the relative phase fluctuations of three different lasers (1). We take advantage of this phase coherence to build a stable dark state (2) based on three-photon coherent population trapping (CPT) in a cloud of trapped Ca^+ ions. When fulfilled, the three-photon resonance condition is observed as a dark resonance in the laser induced fluorescence and offers a highly resolved line referenced to the $|D_{3/2}\rangle$ and $|D_{5/2}\rangle$ transition at 1.82 THz (see fig.1). Based on our first observations, the expected performances in view of a high precision measurement will be presented.

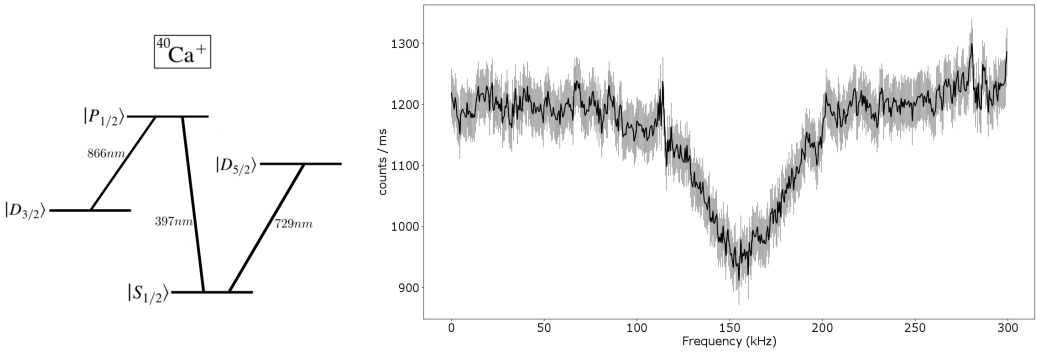

Figure 1: On the left, a level scheme of Ca^+ relevant for a three-photon CPT. On the right, the spectrum of a dark resonance, with a contrast of 22\% and a FWHM of 52kHz, from a cloud of 500 ions.

Choix de session parallèle

1.4 Mesures de précision avec des peignes de fréquence optiques

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