



# Optical transitions in highly-charged californium ions with high sensitivity to variation of the fine-structure constant

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(Submitted on 3 Apr 2012)

We study electronic transitions in highly-charged Cf ions that are within the frequency range of optical lasers and have very high sensitivity to potential variations in the fine-structure constant,  $\alpha$ . The transitions are in the optical despite the large ionisation energies because they lie on the level-crossing of the 5f and 6p valence orbitals in the thallium isoelectronic sequence. Cf16+ is a particularly rich ion, having several narrow lines with properties that minimize certain systematic effects. Cf16+ has very large nuclear charge and large ionisation energy, resulting in the largest  $\alpha$ -sensitivity seen in atomic systems. The lines include positive and negative shifters.

Subjects: **Atomic Physics (physics.atom-ph)**  
Journal reference: Phys. Rev. Lett. 109, 070802 (2012)  
DOI: [10.1103/PhysRevLett.109.070802](https://doi.org/10.1103/PhysRevLett.109.070802)  
Cite as: [arXiv:1204.0603](https://arxiv.org/abs/1204.0603) [physics.atom-ph]  
(or [arXiv:1204.0603v1](https://arxiv.org/abs/1204.0603v1) [physics.atom-ph] for this version)

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