

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Branching ratio, transition frequency and lifetime measurements in $^{88}\text{Sr}^+$ with trapped ions¹ HELENA ZHANG, MICHAEL GUTIERREZ, GUANG HAO LOW, ISAAC CHUANG, Massachusetts Inst of Tech-MIT — Precise measurements of atomic properties, such as branching ratios and transition frequencies and lifetimes, are important in the study of astrophysical objects as well as verification of relativistic many-body theories. We report on a new measurement of the branching ratio of the $5P_{1/2}$ and $5P_{3/2}$ states in $^{88}\text{Sr}^+$ to 10^{-4} fractional uncertainty, a 10^3 times improvement over current results, using ions confined in a Paul trap. Using a fiber frequency comb and pulsed spectroscopy, we measure the absolute frequencies of the $5S_{1/2} - 5P_{1/2}$ and $5S_{1/2} - 5P_{3/2}$ transitions to within 200 kHz, previously only known to tens of MHz. By fitting the fluorescence curve of the ion with optical Bloch equations, we obtain a new measurement for the lifetime of the $5P_{1/2}$ and $5P_{3/2}$ states without using a pulsed laser source.

¹Supported by the IARPA MQCO program and the ARO Quantum Algorithms program

Helena Zhang
Massachusetts Inst of Tech-MIT

Date submitted: 06 Nov 2015

Electronic form version 1.4