

Abstract Submitted
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Single ion measurement of the branching ratios of the $6P_{3/2}$ decay in BaII¹ N. KURZ, M.R. DIETRICH, G. SHU, J.S. SALACKA, R. BOWLER, B.B. BLINOV, University of Washington — We report a new measurement of the branching ratios of the $6P_{3/2}$ state decay of $^{138}\text{Ba}^+$ into the $5D_{5/2}$ and $5D_{3/2}$ states. The measurement was performed on a single ion in a linear Paul trap excited with 455 nm light from a doubled mode-locked Ti:Sapphire laser driving the $6S_{1/2} - 6P_{3/2}$ transition, followed by detecting the ion's fluorescence on the $6S_{1/2} - 6P_{1/2}$ cooling transition. The use of a single ion in ultrahigh vacuum eliminates many of the systematics of the earlier measurements. Excluding decays directly to the ground state, we determine ratios of 0.881 and 0.118 for the $5D_{5/2}$ and $5D_{3/2}$ decays respectively with a 3% statistical and 1% systematic error. This is an improvement of a factor of three over previously reported data [1]. This level of precision is sufficient to compare to numerical calculations [2]. Work is underway to establish absolute values for all three ratios ($6P_{3/2} \rightarrow 6S_{1/2}$, $5D_{3/2}$, $5D_{5/2}$) by driving a π Rabi rotation on the $6S_{1/2} - 6P_{3/2}$ transition with a single laser pulse. ¹ Kastberg, et.al., *J Opt. Soc. Am. B* **10**, 1330-6, (1993). ² Gopakumar, G., *Phys. Rev. A* **66** 032505-1-6, (2002).

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