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# (G*) First Measurement of the 7s–8s M1 Transition in Francium

*Wednesday, 8 June 2022 13:45 (15 minutes)*

Atomic parity-violation (APV) experiments play an important role as low-energy, neutral current, searches for physics beyond the Standard Model. Francium is an ideal candidate for APV experiments due to its high-Z and single valence electron. Our planned Fr APV experiment will probe the 7s–8s transition (506 nm) in an external electric field. Relativistic effects and hyperfine interactions give rise to an extremely weak magnetic dipole (M1) transition, with oscillator strength f ~10ˆ−13. In our experiment we use a magneto-optical trap to cool and trap 211Fr between a pair of transparent indium tin oxide field plates. To detect the faint M1 transition, we use an ultra-high vacuum compatible power build-up cavity that enhances the light power ~ 4000 fold. I will discuss our measurements of the M1 and Stark-induced E1 transitions. Their comparison allows us to extract the strength of the relativistic M1 amplitude and compare it to recent theoretical predictions from literature. Our preliminary results suggest this first measurement will have better than 10% accuracy on the relativistic contribution to the M1 transition, similar to the difference between theory and experiment of the analogous transition in Cs.
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