Contribution ID: **55** Type: **Contributed poster presentation**

Atomic Parity Violation Detection through Forbidden Transitions in Optically Trapped Francium

Measuring Atomic Parity Violation (APV) in the weak interaction is an excellent way to test the standard model at low momentum scales. One way to do this is studying parity violating transitions in alkali atoms. Francium is the ideal element to use in these searches, as its heavy mass gives a relativistic enhancement to parity violating transitions 18 times that of Cesium. The Francium Trapping Facility (FTF) at TRIUMF allows for the trapping of francium by neutralizing francium ions created at TRIUMF in a zirconium foil, and then utilizing two Magneto-Optical Traps (MOTs) to hold the atoms in place while they are probed. With this apparatus, effort is ongoing to measure the forbidden M1 7s-8s transition in francium, to prepare for an APV measurement of the transition utilizing Stark interference. Recent developments include the installation of a power buildup cavity to improve the intensity of the 506 nm light used to cycle the 7s-8s transition. An overview of the experimental apparatus at TRIUMF will be presented.

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Session Classification: Reception & Poster Session