Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Efforts to Improve Precision Laser Spectroscopy of Helium Fine Structure[1] CORY NOOK, GARNET CAMERON, DAVID SHINER, University of North Texas — Precision spectroscopy of the 2^3S to 2^3P transitions in helium and their isotope shifts allows for one of the most sensitive tests of the electron-electron interaction in atomic physics as well as for a test of few body nuclear theory. Improving on our previous results requires better statistical precision and further studies of systematic uncertainties. Software and hardware improvements allow for time spent per data point to be reduced from 1s to 100 ms, which improves the averaging over residual system drifts and maintains SQRT(N) precision with increased signal strength. Signal strength improvements using a newly built custom fiber laser allows population transfer of $^4He/^3He$ into the + or – 1 triplet state and increases signal by a factor of 2. A redesign of the apparatus to shorten the length and increase flexibility is underway and will allow for an increase in signal by a factor of 4. Efforts to improve long term data collection and reliability will be described and the current status of the measurements will be discussed.

[1]This work was supported by NSF Grant 1404498

Cory Nook
University of North Texas

Date submitted: 01 Feb 2019 Electronic form version 1.4