We perform vibrational spectroscopy on the $V_{0-10}$ overtone of a trapped and sympathetically cooled CaH$^+$ molecular ion using a resonance enhanced two photon dissociation scheme. Our experiments are motivated by theoretical work that proposes comparing the vibrational overtones of CaH$^+$ with electronic transitions in atoms to detect possible time variation of in the mass ratio of the proton to electron $^a$. Due to the nonexistence of experimental data of the transition, we start the search with a broadband femtosecond Ti:Saph laser guided by theoretical calculations $^b$. Once the vibrational transition has been identified, we will move to CW lasers to perform rotationally resolved spectroscopy.


$^b$Private communication