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Two Photon Resonant Ionization of ^{28}Si Isotopes: Experimental Methods[1] JONATHAN KLUCK*, WILLIAM CZAJKOWSKI*, SIU AU LEE, WILLIAM FAIRBANK, KATHERINE ZAUNBRECHER, Colorado State University — As part of the W.M. Keck Project for research in quantum computing, it was necessary to identify optical frequencies required for resonant photo-ionization of ^{28}Si isotopes. This is necessary to aide in future precision on demand single atom deposition. A silicon atomic beam was excited by a 222nm CW deep ultraviolet laser at between 10 and 30mW from ground state to the $3s^2 3p^2\ 3p_2$ state. Simultaneously a tunable pulsed dye laser operating in the 484 to 490nm range with an average energy around 5mJ was used to photo-ionize the atoms to the $3s3p^3\ {}^3D_0^3$ state. A channeltron was used to measure the number of ions obtained. To determine the ideal resonance frequency for the pulsed laser, initially wide wavelength scans were conducted until peaks in ion count were identified. The resonance frequency was then further refined by conducting narrower width scans while collecting ion counts at various power levels. By this method we were able to obtain saturation curves and determine photo-ionization cross sections.

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