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Direct frequency comb two-photon laser cooling and trapping XUEPING LONG, ANDREW JAYICH, WESLEY C. CAMPBELL, Univ of California - Los Angeles — Generating and manipulating high energy photons for spectroscopy on electric dipole transitions of atoms and molecules with deeply bound valence electrons is difficult. Further, laser cooling of such species is even more challenging for lack of laser power. A possible solution is to drive two-photon transitions [1]. This may alleviate the photon energy problem and open the door to cold, trapped samples of highly desirable species with tightly bound electrons. We perform a proof of principle experiment with rubidium by driving a two-photon transition with an optical frequency comb. We perform optical cooling and extend this technique to trapping, where we are able to make a magneto-optical trap in one dimension. This work is supported by the National Science Foundation CAREER program.

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