Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Praseodymium ions for solid state quantum memory. ADITYA SHARMA, ROBINJEET SINGH, MARTIN RITTER, Joint Quantum Institute, University of Maryland, College Park, MD, ELI WEISSLER, Harvey Mudd College, Claremont, CA, KUMEL KAGALWALA[1], Joint Quantum Institute, University of Maryland, College Park, MD, ELIZABETH GOLDSCHMIDT, University of Illinois, Urbana Champaign, Illinois, ZACHARY LEVINE, ALAN MIGDALL[2], National Institute of Standards and Technology, Gaithersburg — Rare-earth ion doped crystals, owing to the protected optical transition of Lanthanides, offer unique potential to build fully integrated quantum information devices. We investigate atom-light interactions in Pr:YSO solid state crystal to develop efficient single photon storage devices. We use broadband atomic frequency comb (AFC) protocol to spectrally shape the inhomogenously broadened optical transition of Praseodymium ions. W study the effects of hyperfine splitting to generate high quality atomic frequency combs for quantum memory devices. We further utilize rephasing effect of atomic dipoles to demonstrate efficient storage and retrieval of optical pulses through photon echo measurements.

[1]Now at Intel Corporation
[2]Also at: Joint Quantum Institute, University of Maryland, College Park, MD

Robinjeet Singh
University of Maryland, College Park, Maryland

Date submitted: 01 Jun 2020 Electronic form version 1.4