Abstract Submitted
for the NEF07 Meeting of
The American Physical Society

Image Storage in Hot Vapors LU ZHAO, TUN WANG, Department Of Physics, University of Connecticut, Storrs, CT 06269, YANHONG XIAO, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, SUSANNE F. YELIN, Department Of Physics, University of Connecticut, Storrs, CT 06269; ITAMP, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138 — We consider imaging through hot atomic vapors based on light storage technique. A $4f$ system is adopted for imaging. By placing an atomic vapor cell over the transform plane, the Fraunhofer diffraction pattern of an object in the object plane can be transformed into atomic Raman coherence. We investigate how the stored diffraction pattern evolves under diffusion of atoms. Our numerical simulation shows, for a long storage time, the dark spots of the stored pattern can still exist even under strong diffusion conditions. This results from the destructive interference produced by the spatial coherence of Raman coherence. Then, when the stored diffraction pattern is retrieved by applying a reading light, it can produce an image in the image plane. Our result indicates, under appropriate conditions, an image with high fidelity can be reconstructed. This scheme may open a new path for classic or quantum image and information processing.

Lu Zhao
Department Of Physics, University of Connecticut, Storrs, CT 06269

Date submitted: 05 Oct 2007 Electronic form version 1.4