

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Retrieval of contaminated information using random lasers¹ JIN-WEI SHI, DAHE LIU, Beijing Normal University, LIBIN CUI, Beijing Normal University and Beijing University of Technology — Data retrieval is an important information processing task. The most commonly used method in optical information processing is spatial filtering based on Fourier optics. However, these methods are very difficult to implement in practical applications. Over the last two decades, random lasers due to its cavity free property have attracted widespread attention. Some potential applications have been proposed; however, few actual applications were reported. Here we develop an information retrieval method based on random lasers, where the spatial frequency spectrum of a contaminated Fourier transform hologram can be obtained by detecting the temporal frequency spectrum information from random lasing. The hologram information can be reconstructed from an inverse Fourier transform of the spatial frequency spectrum obtained after data processing. It is shown that random lasers can be used for information retrieval, and may potentially find applications in information optics and optical data storage.

¹The authors would also like to thank the National Natural Science Foundation of China (Grant Nos. 11074024, 11104016, and 11374037), and the Fundamental Research Funds of the Central Universities (No. 2013YB65).

Jinwei Shi
Beijing Normal University

Date submitted: 16 Sep 2014

Electronic form version 1.4