

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Photon storage with ultrafast switching in coupled quantum wells

ALEXANDER WINBOW, AARON HAMMACK, LEONID BUTOV, University of California, San Diego, ARTHUR GOSSARD, University of California, Santa Barbara — Photon storage with ultrafast switching was implemented with indirect excitons in coupled quantum wells. The storage and release of photons was controlled by the gate voltage: a pulse of the gate voltage increased the exciton lifetime by orders of magnitude, resulting in storage of the absorbed photons in the form of indirect excitons; the pulse termination led to the emission of the stored photons. The storage time reached microseconds. The write and readout times were subnanosecond, and faster by an order of magnitude than the previously established record for optoelectronic photon storage devices.

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Date submitted: 20 Nov 2006

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