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**Dual All-optical OR/NOR Logic Gates in Hot Rubidium Vapor** ZHIFAN ZHOU, East China Normal University & Joint Quantum Institute, JIETAI JING, CUNJIN LIU, JUN ZHOU, WEIPING ZHANG, East China Normal University, STATE KEY LABORATORY OF PRECISION SPECTROSCOPY, DEPARTMENT OF PHYSICS, EAST CHINA NORMAL UNIVERSITY TEAM, JOINT QUANTUM INSTITUTE, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY AND UNIVERSITY OF MARYLAND COLLABORATION — We experimentally demonstrate a dual all-optical or/nor gate with rapid gate time and low power consumption. Based on four wave mixing(FWM) in a double-lambda system in a rubidium vapor, we observed twobright spots in the output conical emission after proper phase-matching adjustments. We feed the two output spots back into the vapor as the controlled seeding. Thanks to FWM enhanced by atomic coherence, the two feedback seeding beams can independently induce switching of outputs to orthogonal directions, fulfilling an all-optical “NOR” logic gates for initial state and “OR” gate for the switched state simultaneously. The process is featured with rapid response while we show the weak beams are capable of controlling strong beams. The residual power in the conical emission is only 8% of the induced power during the gate operations. The present demonstration has potential applications in the field of all-optical logic devices

Zhifan Zhou  
East China Normal University & Joint Quantum Institute

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