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All-Optical Switching in an Add-Drop Resonator using Two-Photon Absorption in Warm Rubidium Vapor[1] CHAD WEILER, SCOTT HENDRICKSON, The Johns Hopkins University Applied Physics Laboratory, RYAN CAMACHO, Sandia National Laboratories, PETER RAKICH, Yale University, JONATHAN COX, MICHAEL SHAW, Sandia National Laboratories, TODD PITTMAN, JAMES FRANSON, University of Maryland Baltimore County, BRYAN JACOBS, Berbrian and Company — The need for low-power optical switching in the fields of quantum information and classical logic has been well documented. Here we present results showing all-optical switching using a Si_3N_4 micro-disk cavity, in an add/drop configuration, evanescently coupled to hot Rubidium (Rb) vapor. The atomic vapor only dissipates the energy in the cavity when control and signal frequencies sum to a Rb two-photon S-P-D transition. This suppresses the cavity build-up and alters the output path of the signal light. Devices of this type can exhibit fast switching times with ultra-low energy dissipation which make them viable technologies for application in classical logic or quantum information processing.

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