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Spinor Slow Light and Two-Color Qubits ITE YU[1], MENG-JUNG LEE, National Tsing Hua University, JULIUS RUSECKAS, Vilnius University, CHIN-YUAN LEE, National Tsing Hua University, VIACESLAV KUDRIASOV, Vilnius University, KAO-FANG CHANG, HUNG-WEN CHO, National Tsing Hua University, GEDIMINAS JUZELIUNAS, Vilnius University, ITE A. YU, National Tsing Hua University — We report the first experimental demonstration of two-component or spinor slow light (SSL) using a double tripod (DT) atom-light coupling scheme [1]. The scheme involves three atomic ground states coupled to two excited states by six light fields. The oscillation due to the interaction between the two components was observed. SSL can be used to achieve high conversion efficiencies in the sum frequency generation and is a better method than the widely-used double-Λ scheme. On the basis of the stored light, our data showed that the DT scheme behaves like the two outcomes of an interferometer enabling precision measurements of frequency detuning. Furthermore, the single-photon SSL can be considered as the qubit with the superposition state of two frequency modes or, simply, as the two-color qubit. We experimentally demonstrated a possible application of the DT scheme as quantum memory/rotator for the two-color qubit. This work opens up a new direction in the EIT/slow light research.

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