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All-optical photon echo on a chip

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Abstract

© 2016 Astro Ltd. We demonstrate that a photon echo can be implemented by all-optical means using an array of on-chip high-finesse ring cavities whose parameters are chirped in such a way as to support equidistant spectra of cavity modes. When launched into such a system, a classical or quantum optical signal - even a single-photon field - becomes distributed between individual cavities, giving rise to prominent coherence echo revivals at well-defined delay times, controlled by the chirp of cavity parameters. This effect enables long storage times for high-throughput broadband optical delay and quantum memory.

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Keywords

frequency comb all-pass filter, optical delay line, photon echo, quantum memory, ring cavity

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