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Deterministic generation of entangled photon pairs from a semiconductor quantum dot ANDREAS MULLER, WEI FANG, Joint Quantum Institute, NIST and University of Maryland, Maryland, USA, JOHN LAWALL, National Institute of Standards and Technology, Maryland, USA, GLENN SOLOMON, Joint Quantum Institute, NIST and University of Maryland, Maryland, USA — Optical tuning based on the AC Stark effect is used to cancel the fine-structure splitting in a single self-assembled InAs quantum dot. Under this condition, polarization anisotropy vanishes, and photon pairs emitted from the biexcitonic radiative cascade become polarization-entangled. Entanglement is verified by well-known criteria applied to the two-photon density matrix that was reconstructed experimentally via quantum state tomography. Our approach uses a planar optical microcavity for efficient background laser discrimination, and yields triggered polarization-entangled photons deterministically.

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