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Quantum entropy source on an InP photonic integrated circuit for random number generation CARLOS ABELLAN, WALDIMAR AMAYA, ICFO-The Institute of Photonic Sciences, DAVID DOMENECH, VLC Photonics, PASCUAL MUOZ, JOSE CAPMANY, Universitat Politcnica de Valencia, STEFANO LONGHI, Dipartimento di Fisica and Istituto di Fotonica e Nanotecnologie del CNR, MORGAN MITCHELL, VALERIO PRUNERI, ICFO-The Institute of Photonic Sciences — Random number generators are essential to ensuring performance in information technologies, including cryptography, stochastic simulations, and massive data processing. In this talk, we will describe a quantum entropy source for random number generation on an indium phosphide photonic integrated circuit. The proposed chip integrates all the optical elements, including lasers and detectors, and is based on a novel phase-diffusion configuration that uses two-laser interference and heterodyne detection. The resulting device offers high-speed operation and reduced form factor. In addition, its compatibility with complementary metal-oxide semiconductor technology opens the path to its integration in computation and communication electronic devices.

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