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Study of Optical Bistability in Coupled Microdisks[1] S.N. GHOSH, Y.K. VERMA, School of Natural Sciences, University of California, Merced, CA 95344, B.B. BUCKLEY, Department of Physics, University of California, Santa Barbara, California 93106, USA, X. LI, N. SAMARTH, Materials Research Institute, Penn State University, University Park, Pennsylvania 16802, USA, D.D. AWSCHALOM, Department of Physics, University of California, Santa Barbara, California 93106, USA, S. GHOSH, School of Natural Sciences, University of California, Merced, CA 95344, USA — Semiconductor microcavities offer unique means of controlling light-matter interactions in confined geometries, resulting in a wide range of applications in optical communications. We report bi-stable lasing in coupled GaAs microdisks with quantum wells and interface-fluctuation quantum dots in the active region. The inter-disk coupling results in mode-splitting, with the higher energy resonance persistently achieving higher mode Q ($\sim$ 4000). The bi-stability manifests in the form of hysteresis in the intensity of the coupled modes on non-uniform excitation and can be attributed to saturable absorption. This property in the lasing characteristics of coupled cavities gives us a control on the gain modulation and mode-switching and would be useful for applications in optical memories and computing, and in next generation of low-threshold optoelectronic devices.

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