Niloy K.Dutta
University of Connecticut, United States

Semiconductor Optical Amplifiers for Optical logic Applications

All-optical Boolean logic functions AND, XOR and NOT using semiconductor optical amplifiers with quantum-dot (QD) active layers is studied at 40 and 80Gb/s. A rate equation model has been developed which includes nonlinear dynamics including carrier heating, spectral hole-burning, and carrier relaxation. Results show that the QD excited state and wetting layer serve as reservoir of carriers, and, the ultra fast carrier relaxation from these layers, results in high speed Boolean logic operations. Logic operation can be carried out up to speed of 250 Gb/s. Pseudo-random bit stream generation (PRBS) and optical encryption and decryption circuits has been studied.

Biography

Niloy Dutta is a professor of physics at the University of Connecticut, Storrs, CT. He was Director of Optoelectronic Device Research at AT&T Bell Laboratories, Murray Hill, NJ. He is a Life Fellow of the Institute of Electrical Engineers (IEEE), a Fellow of the Optical Society of America, a Fellow of the International Society of Optical Engineers (SPIE), and, a Member of the Connecticut Academy of Science and Engineering. He received the Photonics Society Distinguished Lecturer Award in 1995 and Bell Laboratories President's Award in 1997.

KEYNOTE SPEAKER