We experimentally demonstrate a 160-Gb/s Ethernet packet switch using an 8.6-mm-long silicon nanowire for optical burst switching, based on cross phase modulation in silicon. One of the four packets at the bit rate of 160 Gb/s is switched by an optical control signal using a silicon based 1 × 1 all-optical packet switch. Error free performance (BER <1E-9) is achieved for the switched packet. The use of optical burst switching protocols could eliminate the need for optical buffering in silicon packet switch based optical burst switching, which might be desirable for high-speed interconnects within a short-reach and small-scale network, such as board-to-board interconnects, chip-to-chip interconnects, and on-chip interconnects.
Keywords: elemental semiconductors, local area networks, nanowires, optical burst switching, optical information processing, optical interconnections, packet switching, silicon, Communication, Networking and Broadcast Technologies, Photonics and Electrooptics, bit rate 1.6E+11 bit/s, size 8.6E-03 m, All-optical signal processing, bit rate 160 Gbit/s, bufferless optical burst switching, cross phase modulation, error free performance, Ethernet packet switch, high-speed interconnects, Modulation, optical buffering, optical burst switching (OBS), optical control signal, Optical filters, Optical packet switching, optical packet switching (OPS), Optical switches, optical time division multiplexing (OTDM), photonic switching, short-reach network, Si, Si(role el), Si(role int), Silicon, silicon all-optical packet switch, silicon nanowire, silicon photonics, size 8.6 mm, small-scale network, all-optical signal processing, Optical burst switching (OBS), Optical time division multiplexing (OTDM), Silicon photonics, Integrated circuit interconnects, Nanowires, Optical signal processing, Packet networks, Packet switching, Phase modulation, Photonics, Signal processing, Switching, Time division multiplexing, Cross phase modulation, Optical time division multiplexing, Photonic Switching, Optical burst switching