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Spin-Polarized Edge-Emitting Lasers[1] M. HOLUB, A.T. HANBICKI, C.S. KIM, G. KIOSEOGLOU, O.M.J. VAN 'T ERVE, C.H. LI, I. VURGAFTMAN, J.R. MEYER, B.R. BENNETT, B.T. JONKER, Naval Research Laboratory —
Semiconductor lasers driven by a spin-polarized current are expected to provide a threshold current reduction, optical polarization control, and intensity stabilization. We explore these possibilities in edge-emitting lasers where the low switching fields of in-plane magnetized Fe thin films should enable electronic modulation of the output polarization. Fe/AlGaAs/GaAs heterostructures are designed, grown, and fabricated into surface-emitting light-emitting diodes (LEDs) and double heterostructure lasers. The LED emission is dominated by an H-band feature at 5 K and by the bulk recombination feature at 20 K. An electron spin polarization of 24% is measured in the Faraday geometry. Oxide-stripe lasers are fabricated with and without an Fe capping layer. Lasing is observed at low temperatures with threshold current densities of $\sim$100 A/cm^2. Magnetic field-dependent studies to examine the effects of spin injection on laser performance will be discussed.

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