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**Photoreflectance and Strain Relaxation Studies of Semipolar InGaN** GRACE METCALFE, NATHANIEL WOODWARD, HONGEN SHEN, MICHAEL WRABACK, U.S. Army Research Laboratory, PO SHAN HSU, JAMES SPECK, University of California, Santa Barbara — Recently, there has been a surge of interest in semipolar nitride material for quantum well devices to reduce or eliminate the quantum confined stark effect due to the strong internal polarization. Studies on the effect of the strain relaxation in semipolar nitrides are critical to the successful development and operation of long wavelength devices such as LEDs and LDs. In general, the wavefunctions associated with the A, B, and C exciton transitions in wurtzite material are mixed for crystal orientations other than c-plane. Therefore, the polarization and energy of these exciton interband transitions within wurtzite nitrides also depend on the strain and crystal orientation. In this paper, we present the effects of partial strain relaxation on the optical properties of a thickness series of semipolar (11-22) and (20-21) InGaN compressively strained to GaN using polarization-dependent photoreflectance (PR) measurements. We observe that the absolute energy of the exciton transition parallel to the c-axis is greater than that perpendicular to the c-axis, and the energy separation between them increases with strain relaxation. Our PR data compares well with strain relaxation measurements taken using X-ray diffraction, as well as with our calculations.

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