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Single GaN nanowire polariton luminescence AYAN DAS, MARC JANKOWSKI, WEI GUO, PALLAB BHATTACHARYA, University of Michigan, Ann Arbor — Polariton emission from a single GaN nanowire in the strong coupling regime has been investigated in the temperature range of 200-300 K. GaN nanowires grow in the wurtzite structure with the c-axis along the growth direction. The polariton dispersion characteristics are determined from angle-resolved reflectivity measurements. The light emission characteristics measured as a function of incident optical power density reveal a distinct non-linear behavior and threshold, accompanied by a sharp decrease in linewidth over an order of magnitude and a small blue-shift that is ascribed to polariton-polariton interactions. Angle-resolved photoluminescence measurements above threshold indicate polariton cooling to the bottom of the lower polariton branch, triggered by the onset of stimulated scattering which is characterized by a fast relaxation time as obtained from time resolved photoluminescence measurements. Emission above threshold is linearly polarized. Second order correlation measurements and interferometry indicate significant bunching below threshold and a coherent emission above threshold. These measurements indicate a coherent emission. Photon lasing due to carrier population inversion is observed at higher pump power densities.

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