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Novel low temperature surface reconstructions of GaN(000 $\bar{1}$): A LT-STM investigations KENDAL CLARK, DANDA P. ACHARYA, MUHAMMAD B. HAIDER, ARTHUR R. SMITH, SAW-WAI HLA, Ohio University — The nitrogen polar gallium-rich GaN (000 $\bar{1}$) samples are grown on sapphire (0001) substrates at sample temperature of 650 °C using r.f. N-plasma molecular beam epitaxy. During the growth, the surface is monitored by using reflection high energy electron diffraction and 3x3 and 6x6 reconstructed surface patterns have been observed. The freshly grown samples are then transferred to a low-temperature scanning tunneling microscope (LT-STM) system in an ultra-high-vacuum environment. Then the sample temperature is lowered to 75 K and 4.6 K for the STM investigations. The STM images reveal four novel low temperature reconstructions on this surface. We will also present voltage dependent STM images and tunneling spectroscopy data acquired on these structures. This work is financially supported by a NSF-NIRT grant no. DMR-0304314. (NIRT collaboration).

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