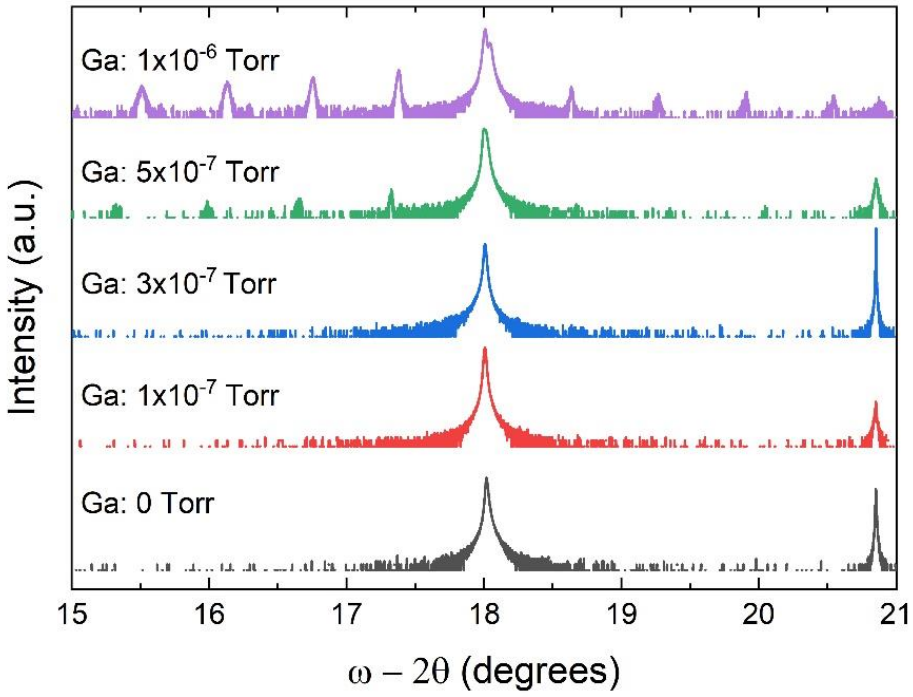

Figure 1*:* Coupled XRD scans of AlN for various Ga overpressures. For Ga fluxes greater than $3x10^{-7}$ the formation of a zeroth order superlattice peak accompanied with higher order satellite peaks appear. The left shift of the zeroth peak with increasing Ga indicates an increase in the GaN layer thickness.

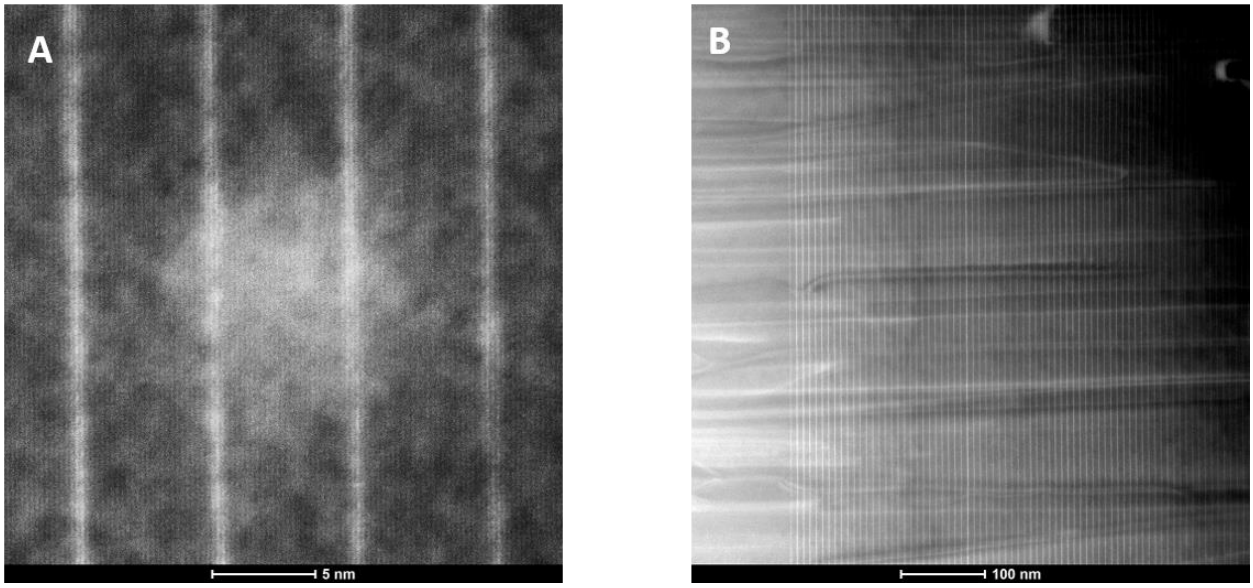

Figure 2*:* TEM imaging of GaN/AlN SPSLs. A) Close up view of the superlattice showing that the GaN layers are 2 ML thick. B) Wide view TEM image showcasing the high degree of layer to layer uniformity.

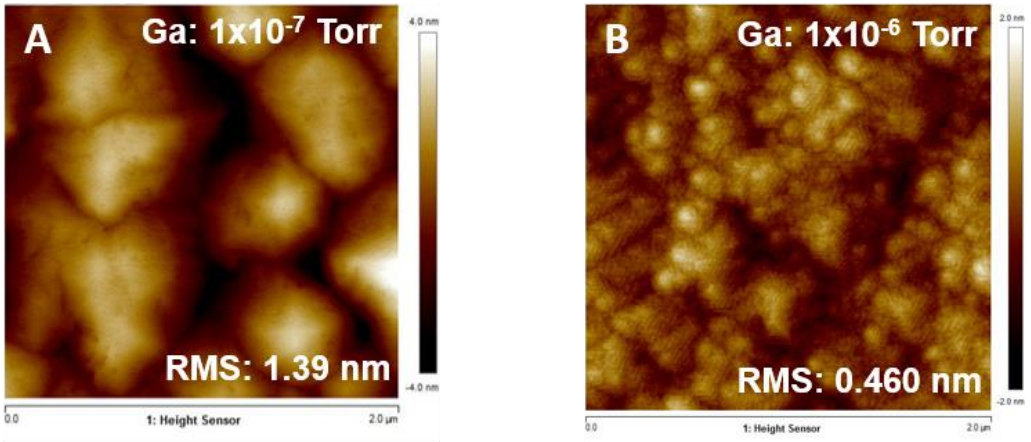

Figure 3: AFM comparison of the resulting surfaces for 2 different Ga overpressures: (A) $1x10^{-7}$ Torr and (B) $1x10^{-6}$ Torr. When the higher Ga flux is used, the RMS roughness drops to atomic levels, at .46 nm. Additionally, the hillock size reduce dramatically indicating improved surface adatom mobility.

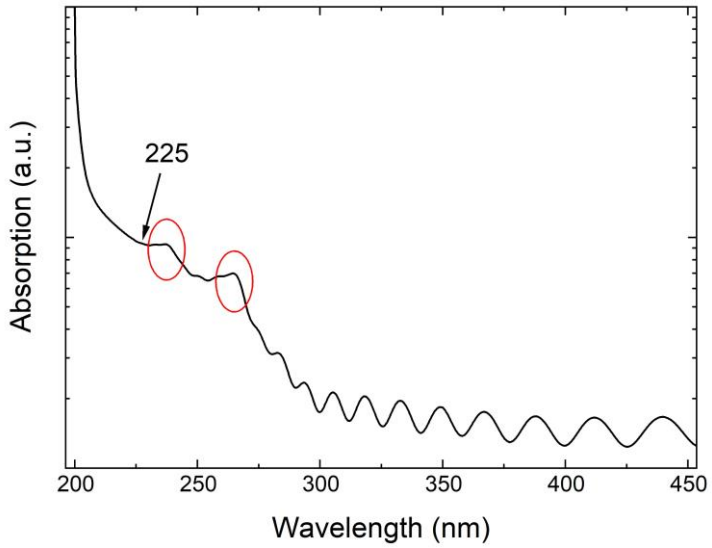

Figure 4: UV-Vis absorption spectra of a Si doped GaN/AlN SPSL. There is a prominent increase in the absorption at 225 nm which corresponds to an AlGaN alloy with 75% Al. This is very close to the 78% Al content simulated in XRD. The origin of the 2 circled peaks is still being investigated but could be related to excitons from the QW's or plasmons from the SI doping.