

## Objective

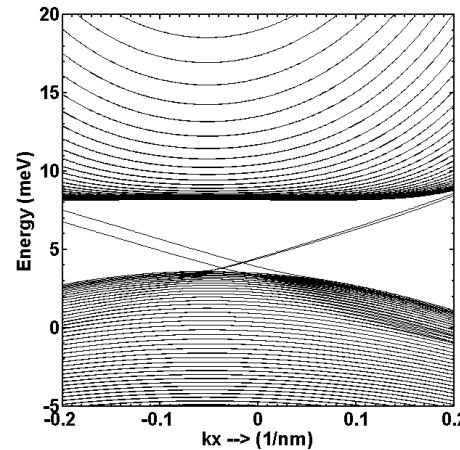
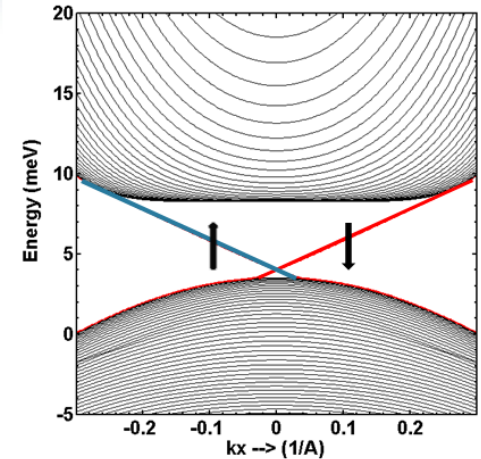
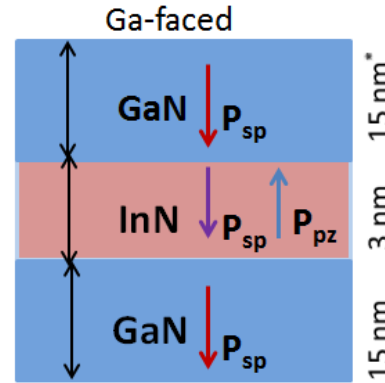
- Use the strong internal polarization of wurtzite-nitride materials to invert bands and create a topological insulator

## Method

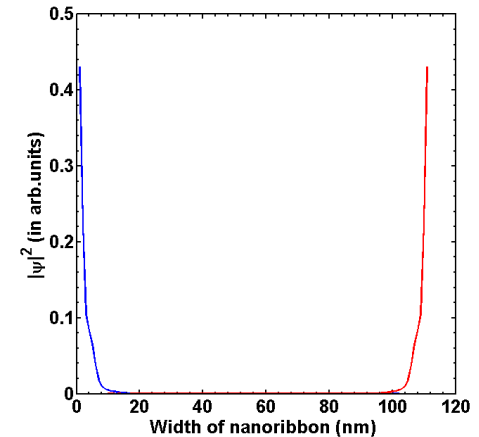
- 8-band k.p Hamiltonian for wurtzite crystals
- Spontaneous and piezo polarization induced potential added to Hamiltonian
- Strain calculated using Bir-Pikus deformation potential

## Results

- Spin-polarized TI states observed for a wurtzite GaN/InN/GaN nano-ribbon
- InN layer of thickness between 3-4 nm needed for TI states
- Under mutually perpendicular electric and magnetic fields TI states displaced laterally and vertically respectively



Dispersion under mutually perpendicular E and B field



This is the only third case currently known to possess TI states because of band alignment (GaSb-InAs and InSb are the other examples)