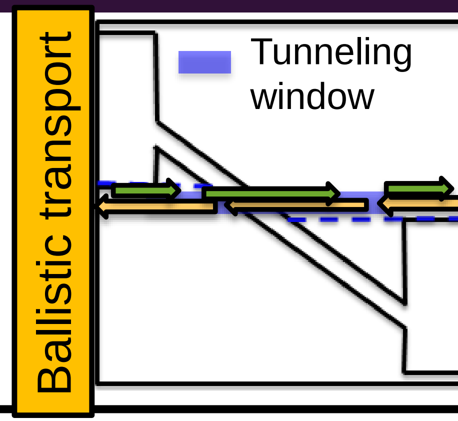
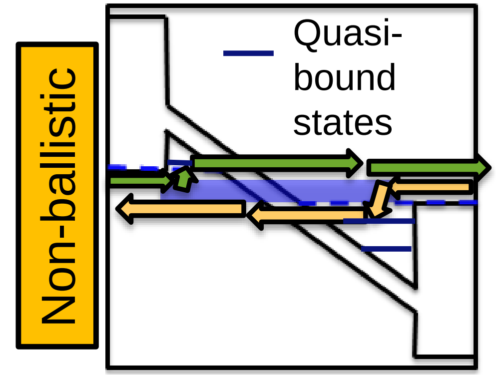
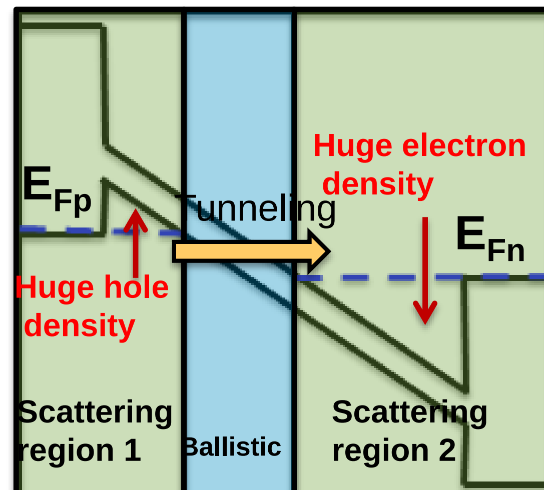
Modeling Nitride TFETs with phenomenological scattering

Objective:
Study the effect of strong scattering at quasi-bound states of Nitride TFETs.





Approach:
1. Divide into 3 regions:
   i. Scattering region 1
   ii. Ballistic region (at center)
   iii. Scattering region 2
2. Add broadening, $i\eta$ to the inverse Green's function of scattering regions.



Here,
Σ = Self-energy
$\eta(E)$ = Broadening of state E = $\frac{\hbar}{2\tau}$
τ = Lifetime/relaxation time of carriers

Inverse Green's function, $G^{R^{-1}}$

$E - H - \Sigma(E) - i\eta(E)$	$E - H - \Sigma(E)$	$E - H - \Sigma(E) - i\eta(E)$

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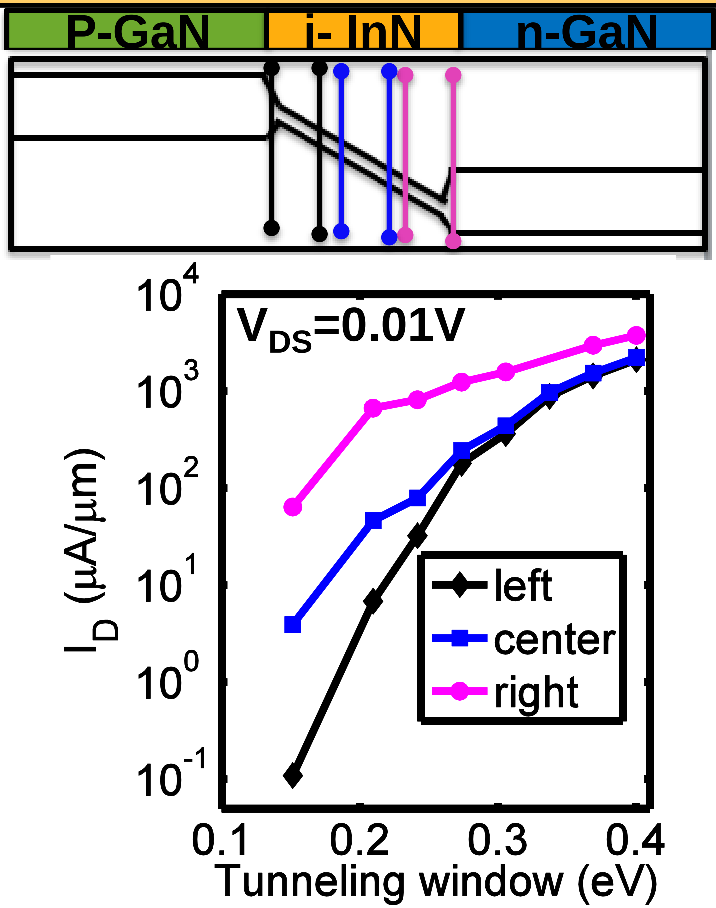
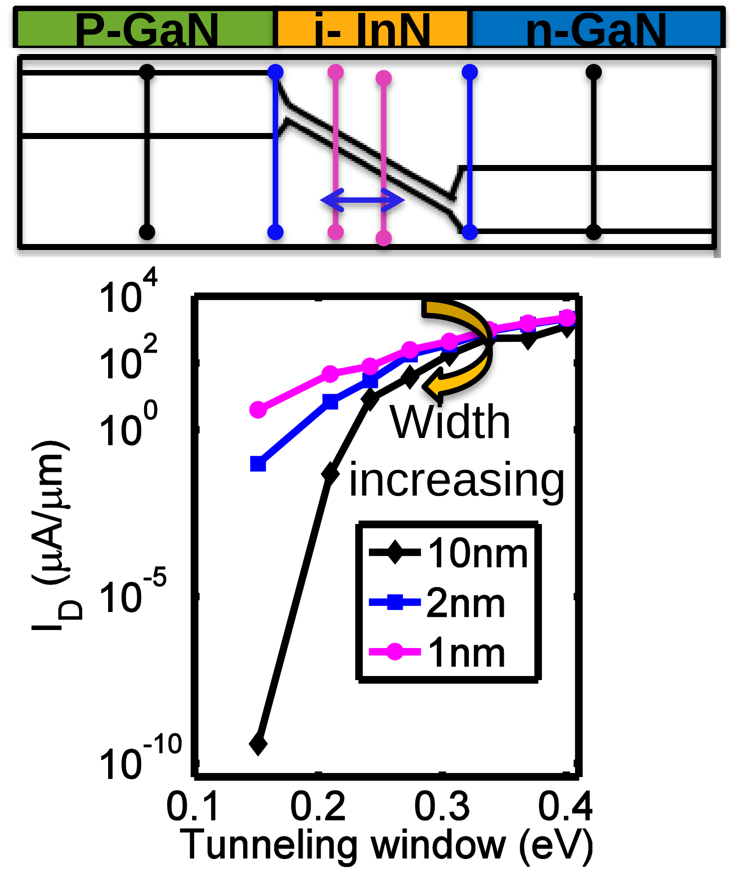
Modeling Nitride TFETs with phenomenological scattering (Contd.)

Effect of the position of ballistic region



Results:
Current density is very sensitive to the position of the ballistic region.

Effect of the width of ballistic region



Results:
Underestimation of tunneling probability in absence of scattering

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