

I PROBLEM

- Inaccurate transport behavior in classical model — carrier density and turn-on voltage
- Rigorous NEGF model computationally too expensive

II APPROACH

- Multi-domain treatment
- Efficient inclusion of strong scattering
- Rate equations coupling electron / hole transport with recombination

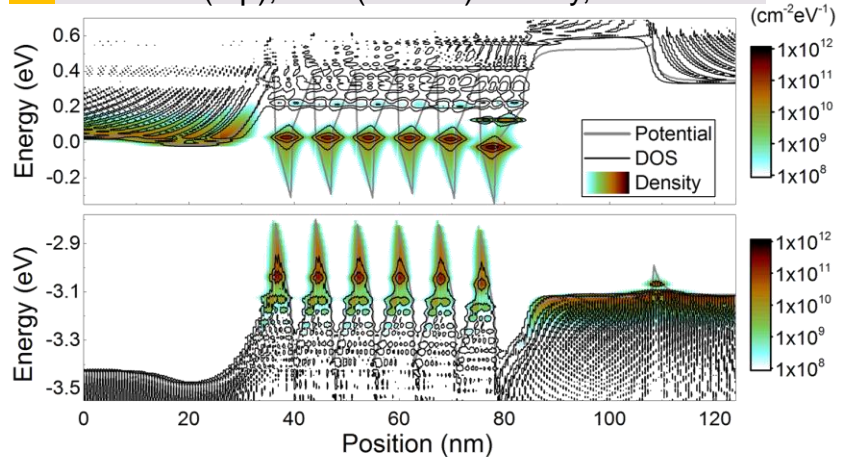
III IMPACT

- Physically accurate, numerical efficient quantum transport in realistic LED
- Quantitative I-V agreement with experiment.

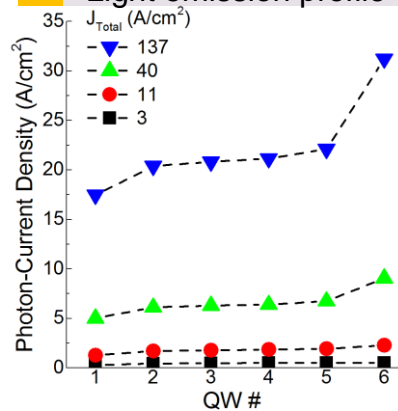
IV FUTURE WORK

- Improve optical and scattering models
- Apply the model for device optimization

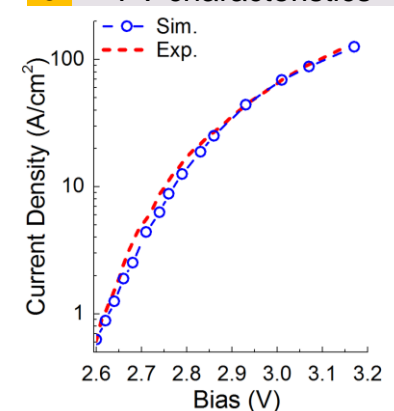
1 Electron (top), hole (bottom) density, local DOS



2 Light emission profile



3 I-V characteristics



1) Spatial and energy distribution of quantum charge w.r.t available states. 2) Photon current profile indicates most emission occurs in p-side QW. 3) I-V quantitatively agrees with experiment.