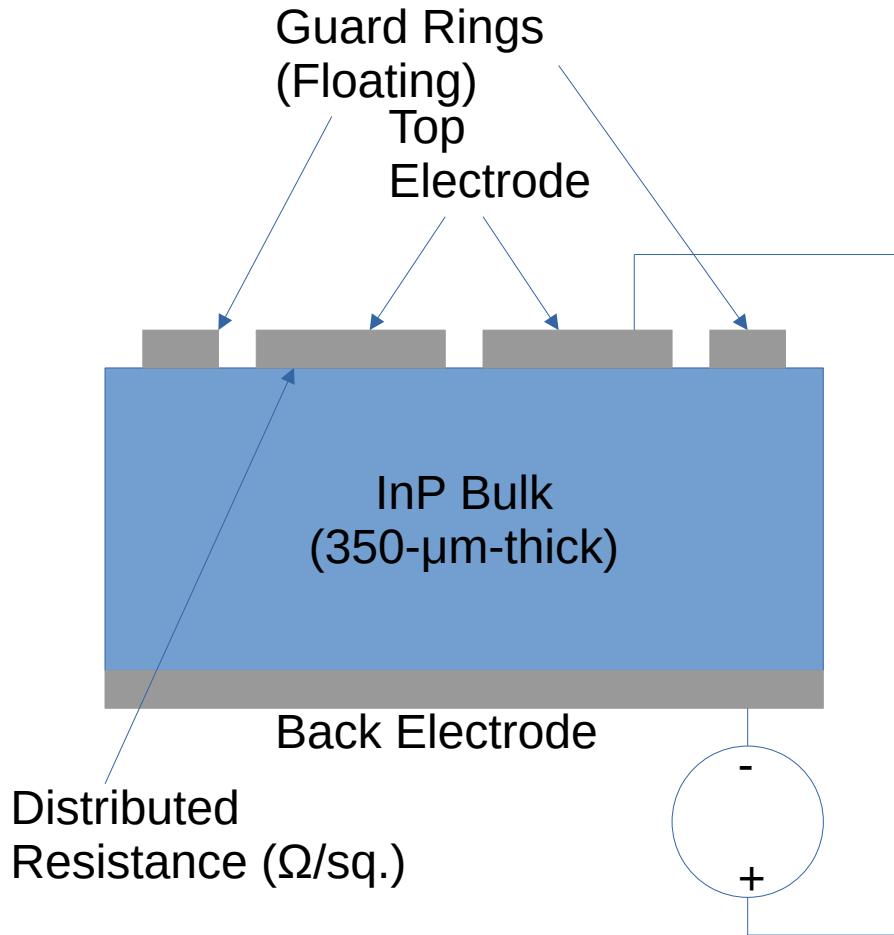


InP Device TCAD Optimization Progress

Base Trap States

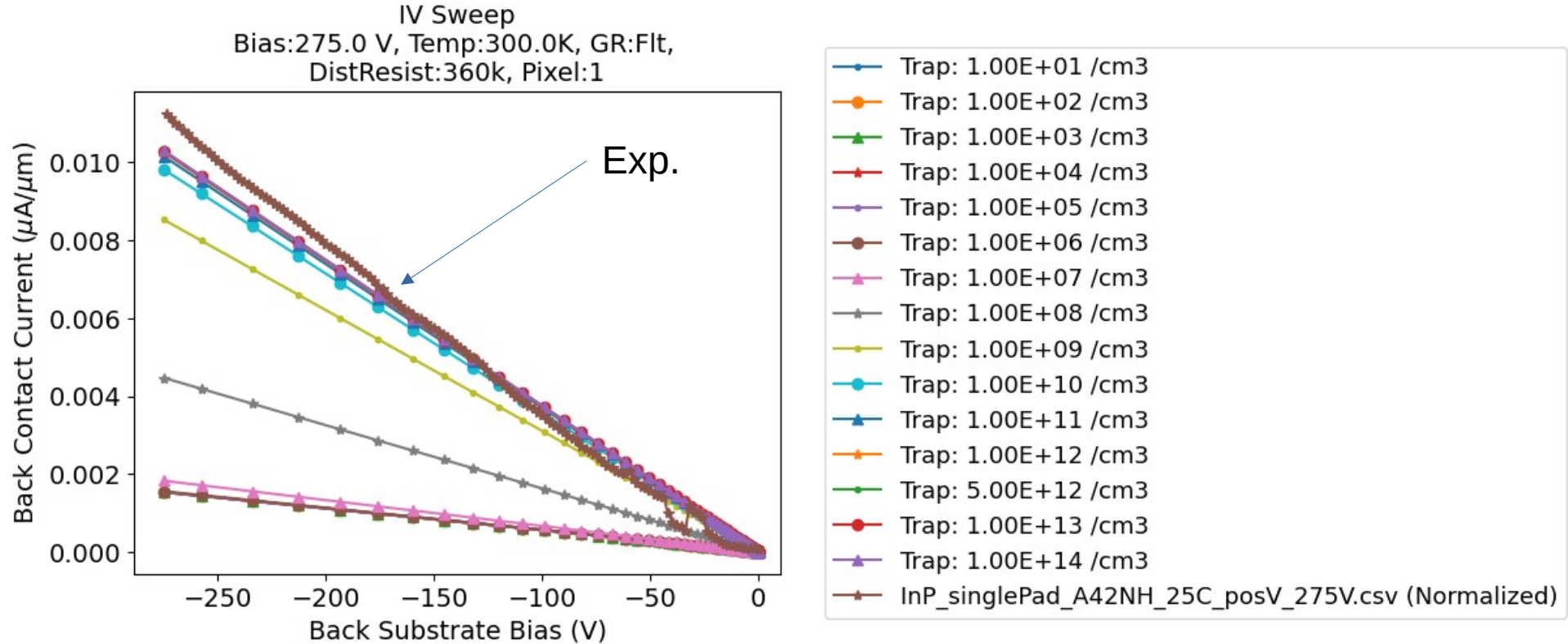
Taylor Shin
Sep. 15th 2026

Device Model

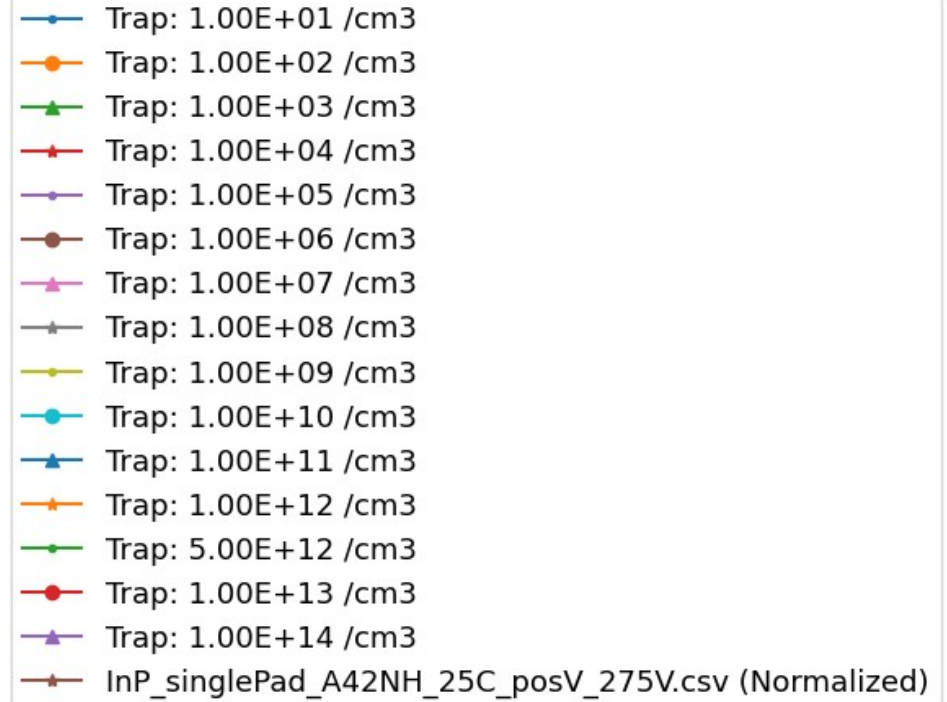
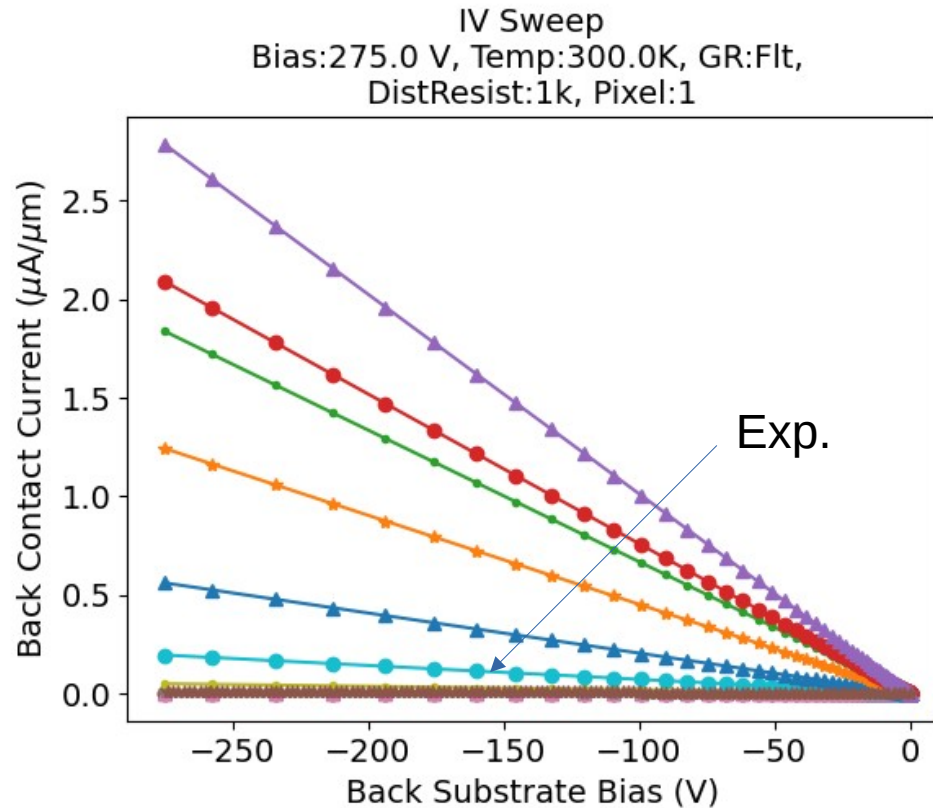


- Metal Workfunction switched to 4.1 eV for Chromium Contacts.
- Distributed Resistance varied from 1k ~ 360k $\Omega/\text{sq.}$
- Bulk trap states sweep: 1e1 /cm³ to 1e14 /cm³
- Now the simulation converges without any problem!

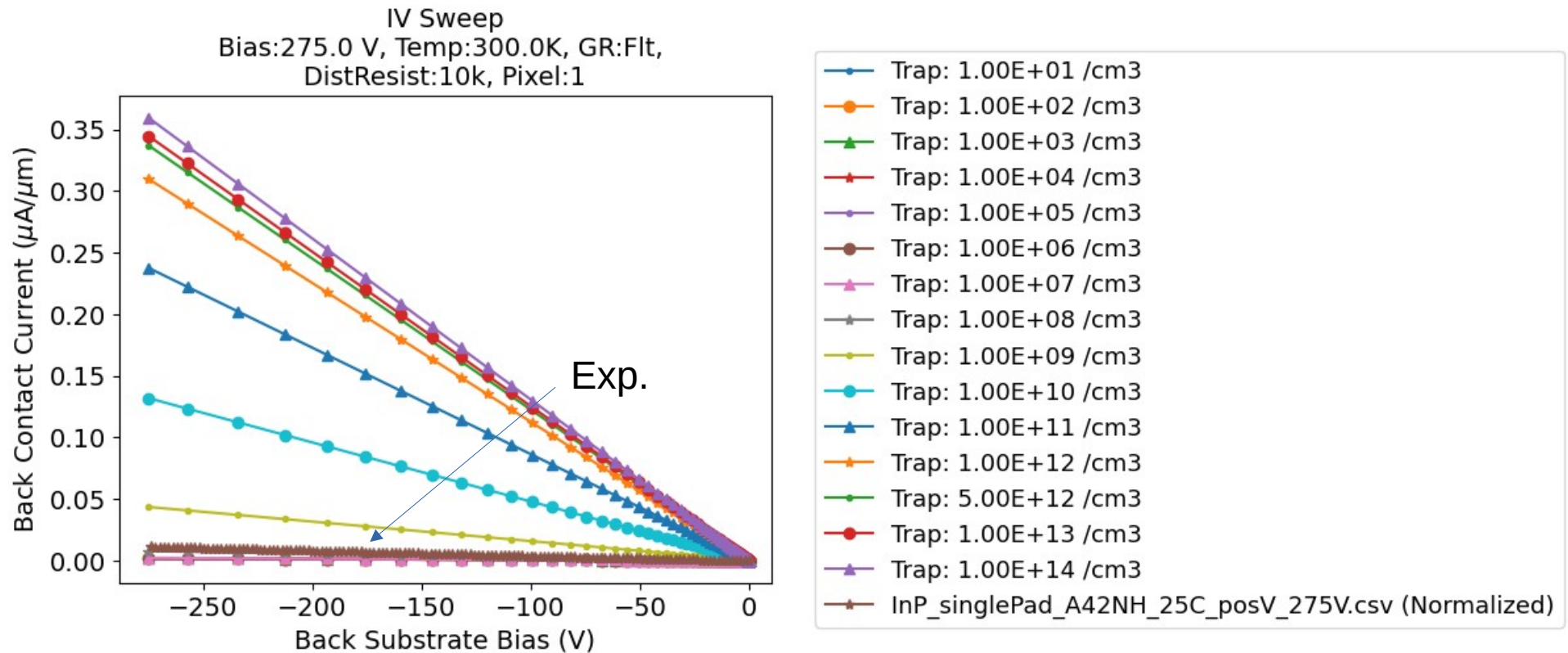
IV Sweep (0-275V), DistR 360k



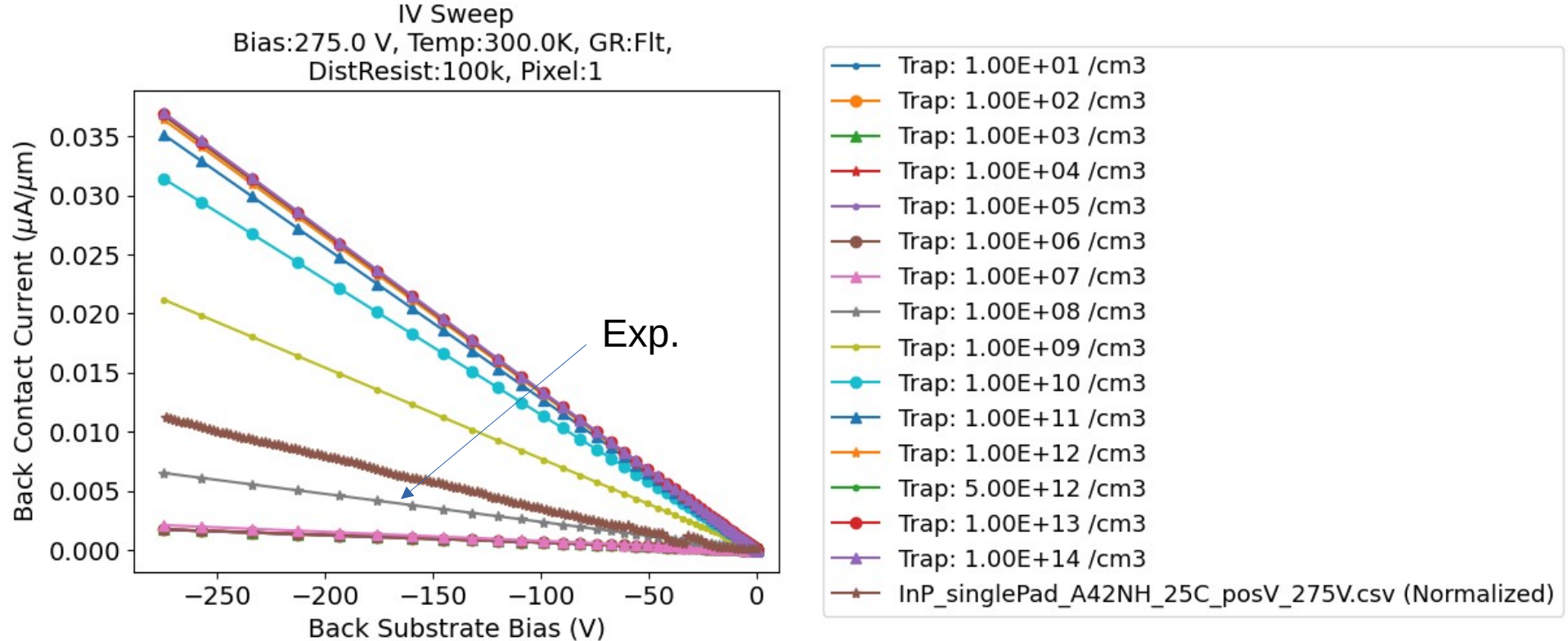
IV Sweep (0-275V), DistR 1k



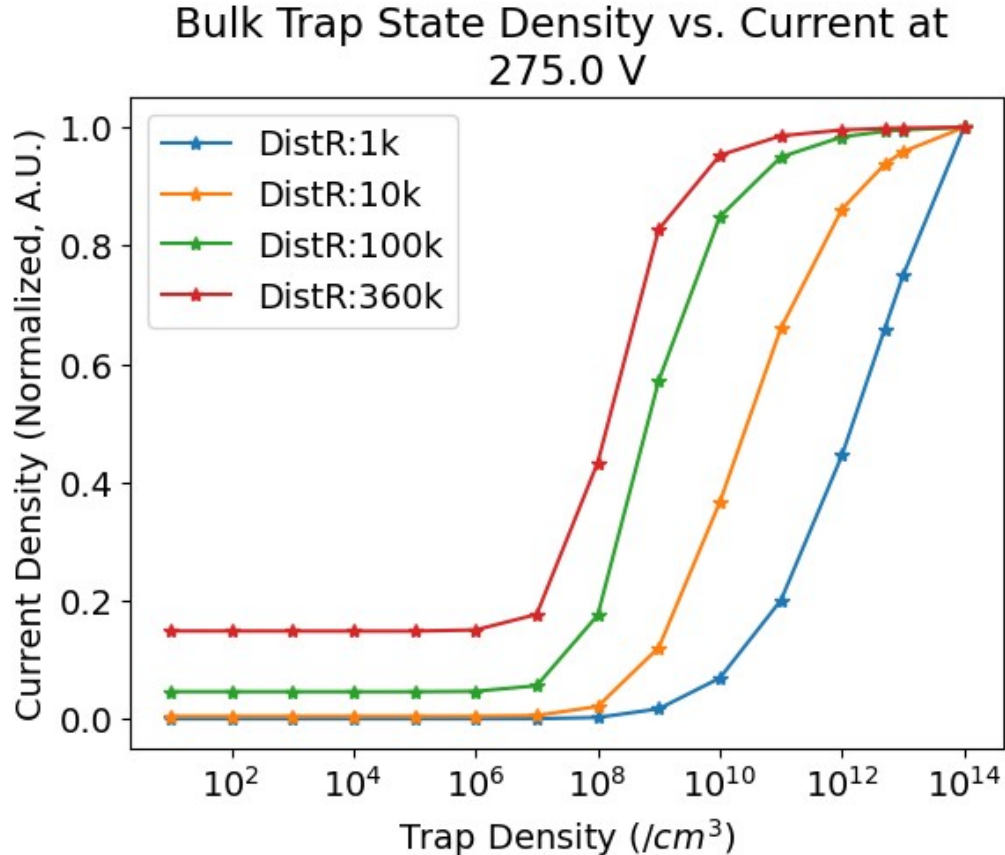
IV Sweep (0-275V), DistR 10k



IV Sweep (0-275V), DistR 100k



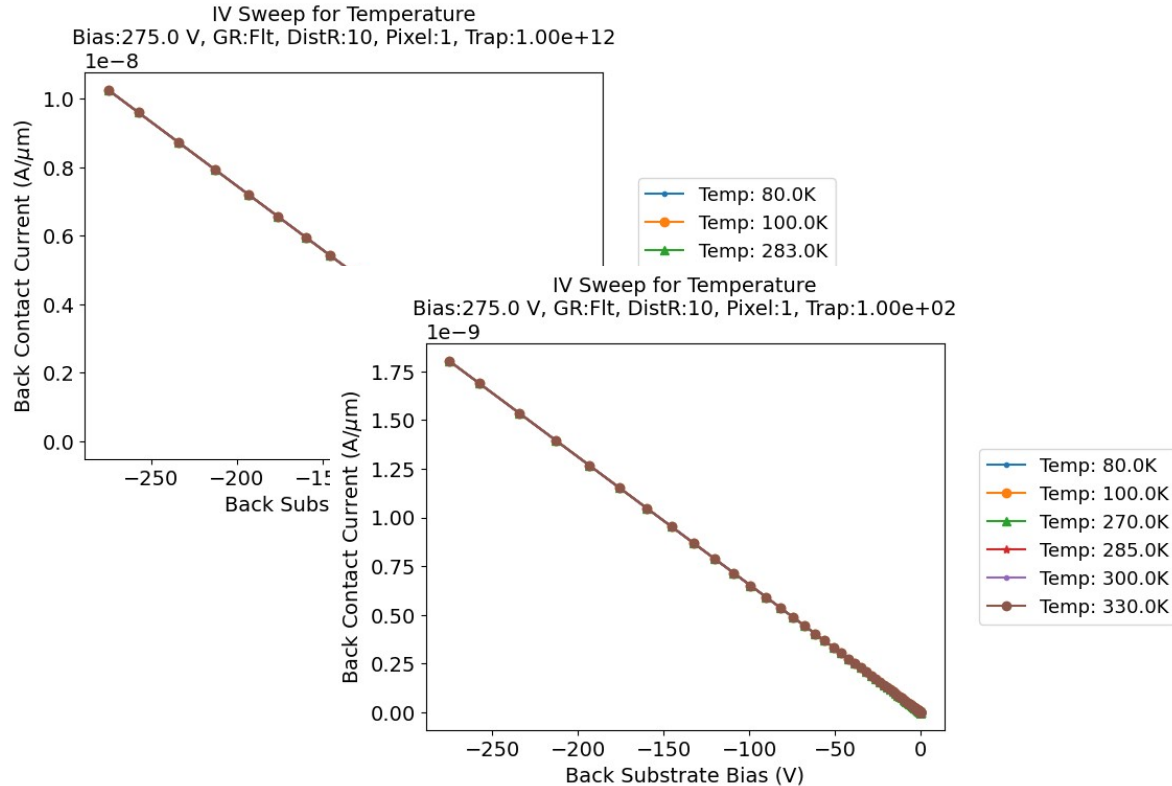
Bulk Trap State Sensitivity



- The current scale obviously suppressed by the Distributed Resistance.
- As expected, the more traps introduced, the more intrinsic current is supplied from them.
- But those intrinsic current are being suppressed by the metal contact sheet resistance.
- At this point, we would like to eliminate a variable --> Trap states? Or Sheet Resistance of InP surface?

Still Ongoing...

Temperature Dependence



- At the moment, temperature dependent models do not seem to be working with trap states introduced.
- Even with Trap of $1e2 /cm^3$, Any Distributed R, no Temperature dependence was observed.
- We need to delve back into the model parameter section again.