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# Evaluation of the EKV3 Compact Model for Low Temperature Analog Circuit Simulation

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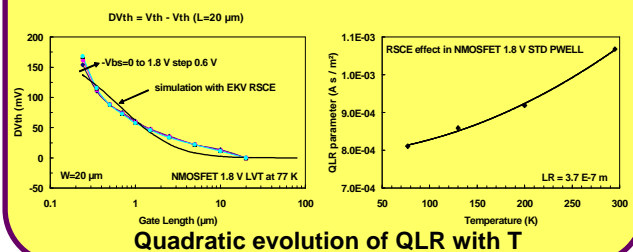
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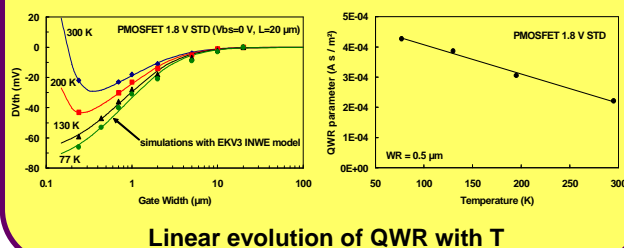
## Aim of this work

- ✓ Design of hybrid read-out circuits for night vision using high performance detectors
- ✓ CMOS process: 0.18  $\mu\text{m}$  (1.8 V & 3.3 V MOSFETs)
- ✓ Need for an advanced compact model for analog IC design at Low Temperature (LT): 77 K – 200 K
- ✓ Which model to use: EKV3, HiSIM2 or PSP ?
- ✓ EKV3 model evaluated in this work

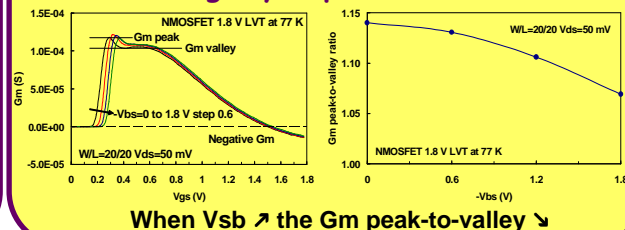
## RSCE and temperature modeling



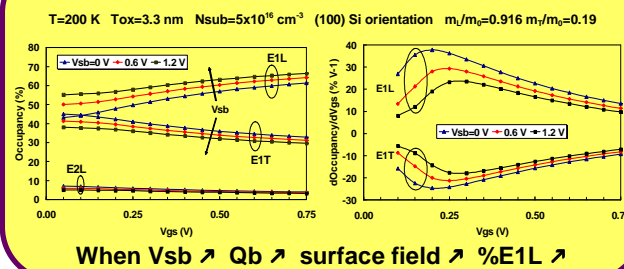
## INWE and temperature modeling



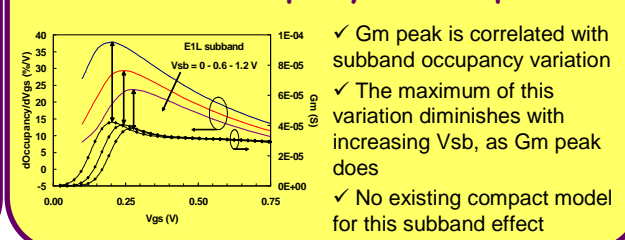
## Gm peak observed in moderate inversion and lightly doped MOSFETs



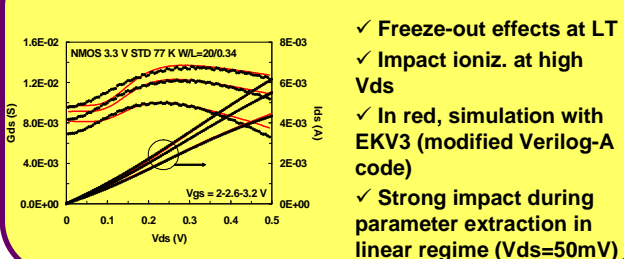
## Poisson-Schrödinger simulations



## Correlation between the variation of E1L subband occupancy and Gm peak



## Freeze-out in LDD regions



## Conclusion

- ✓ Some specific effects observed at LT
  - ✓ Must be taken into account during parameter extraction
  - ✓ EKV3 is a good candidate for analog circuit simulation, but should be improved for accurate modeling at LT
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