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## **Assessment of device RF performance and behavior using TCAD simulation**

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Thomas Zimmer

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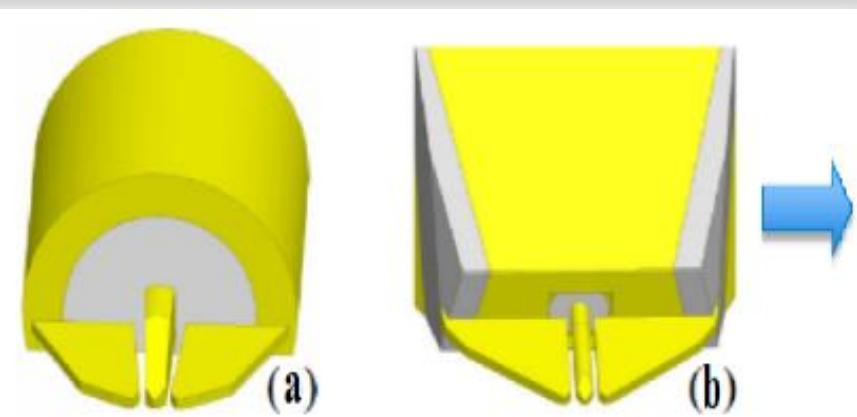
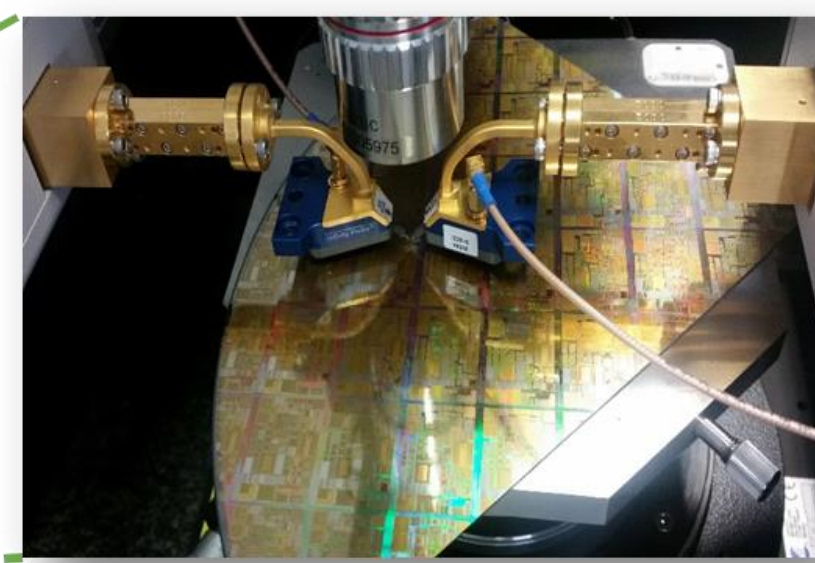
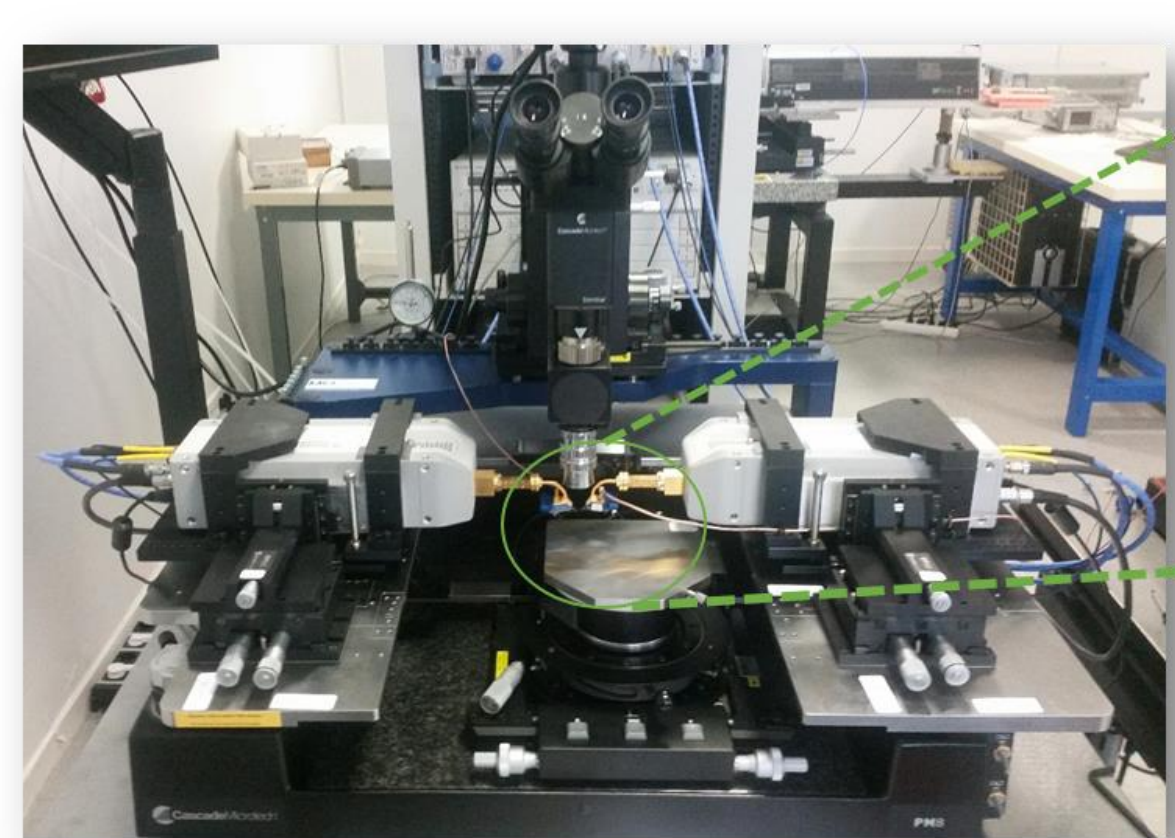
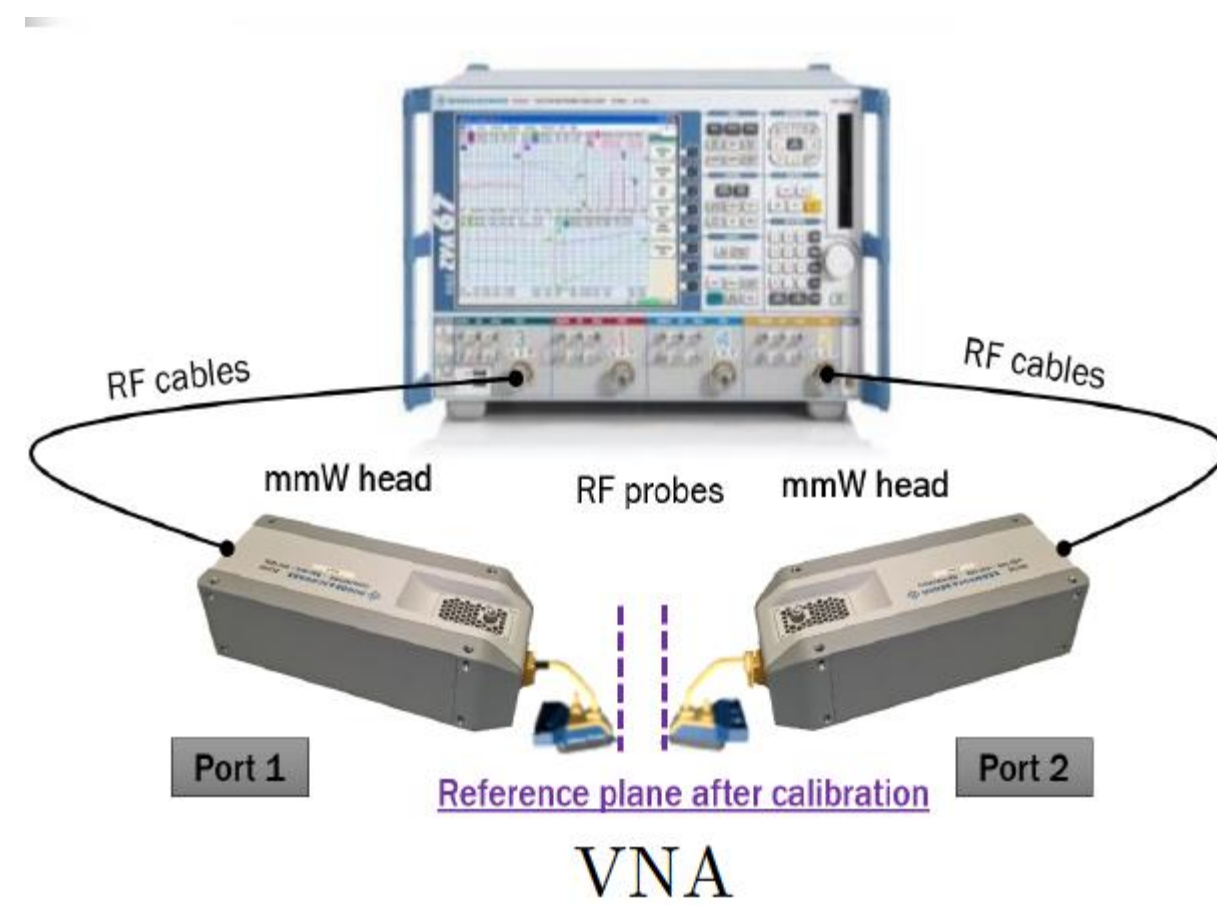
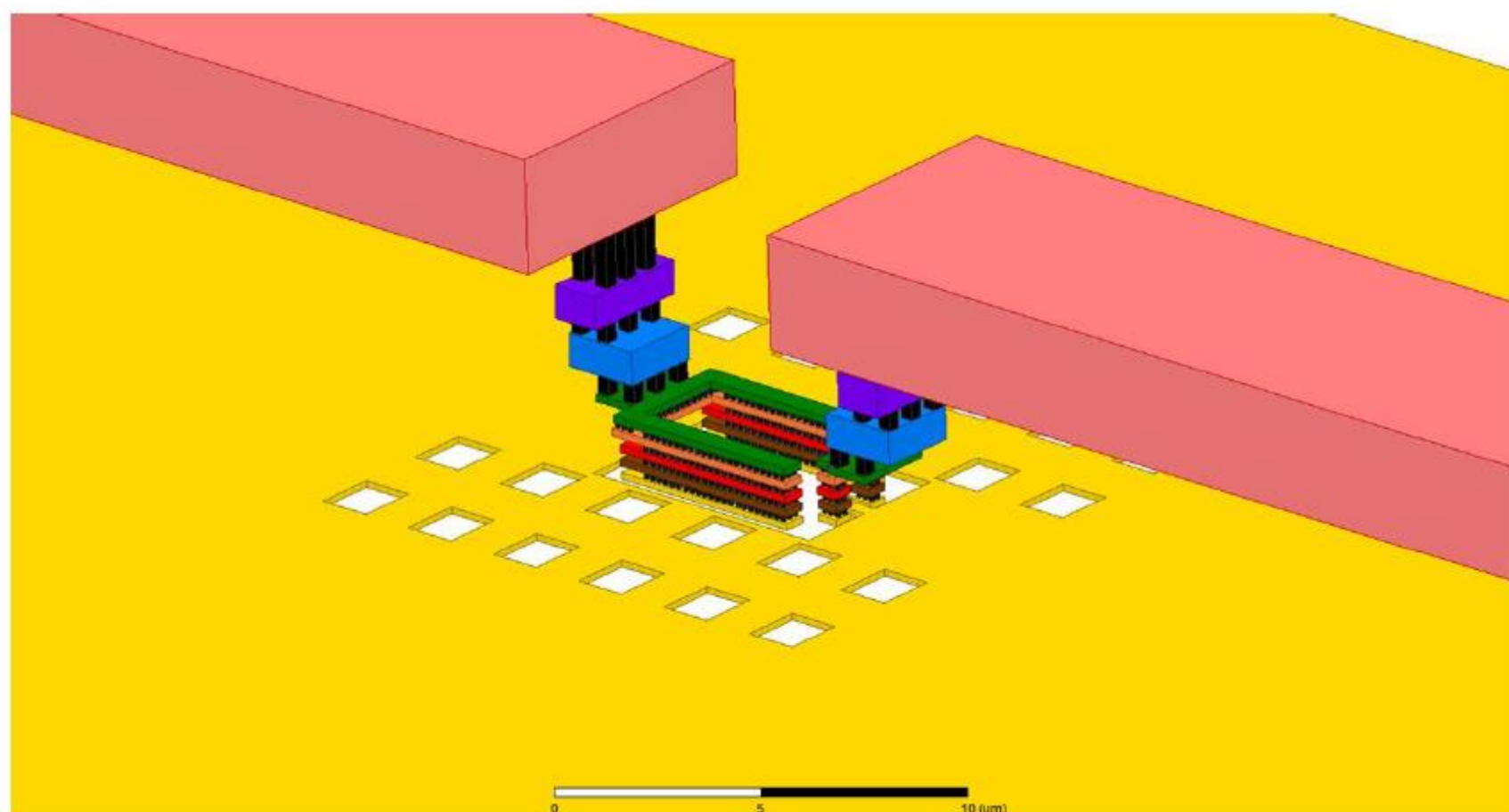
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# Assessment of device RF performance and behavior using TCAD simulation

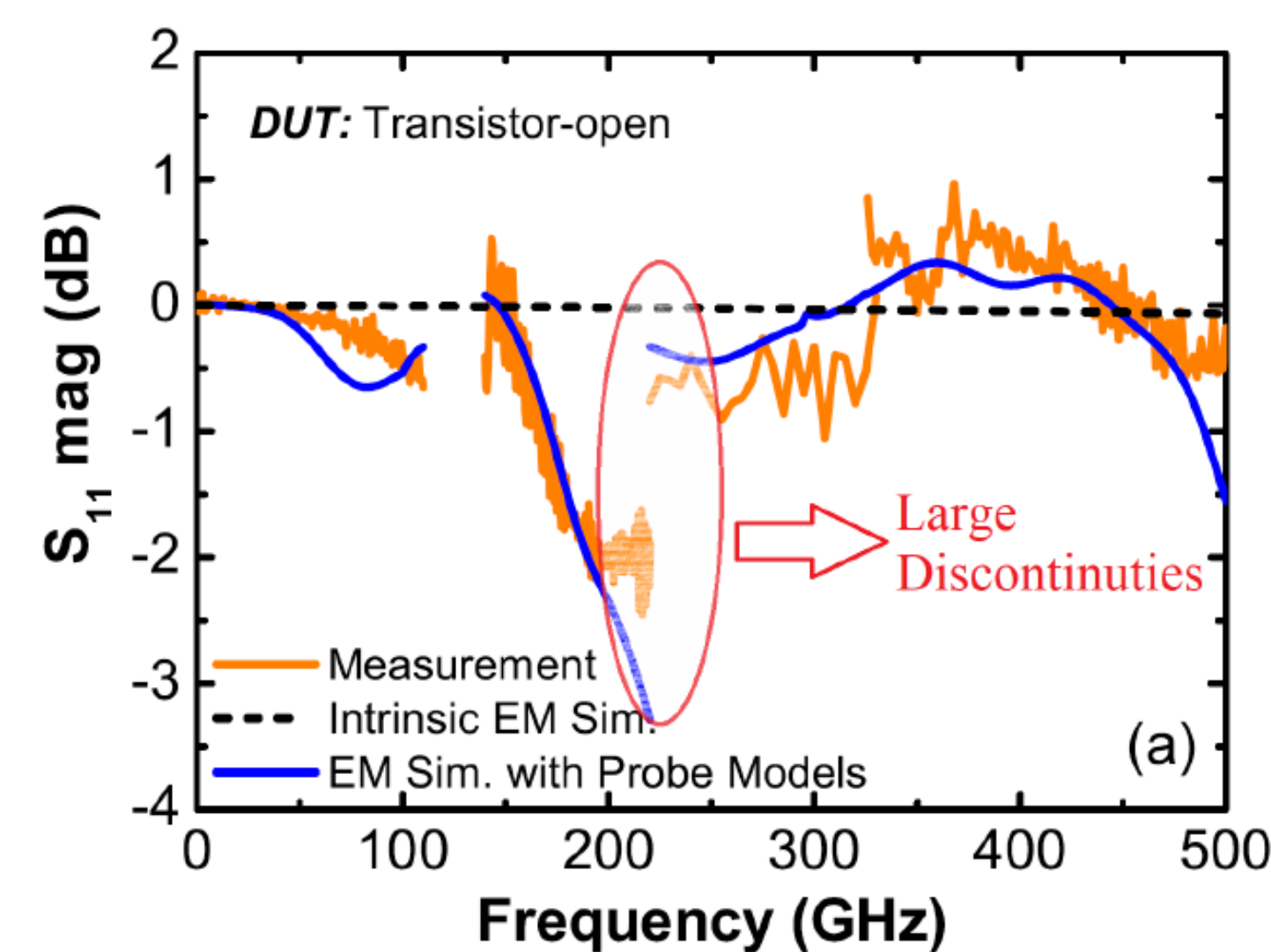
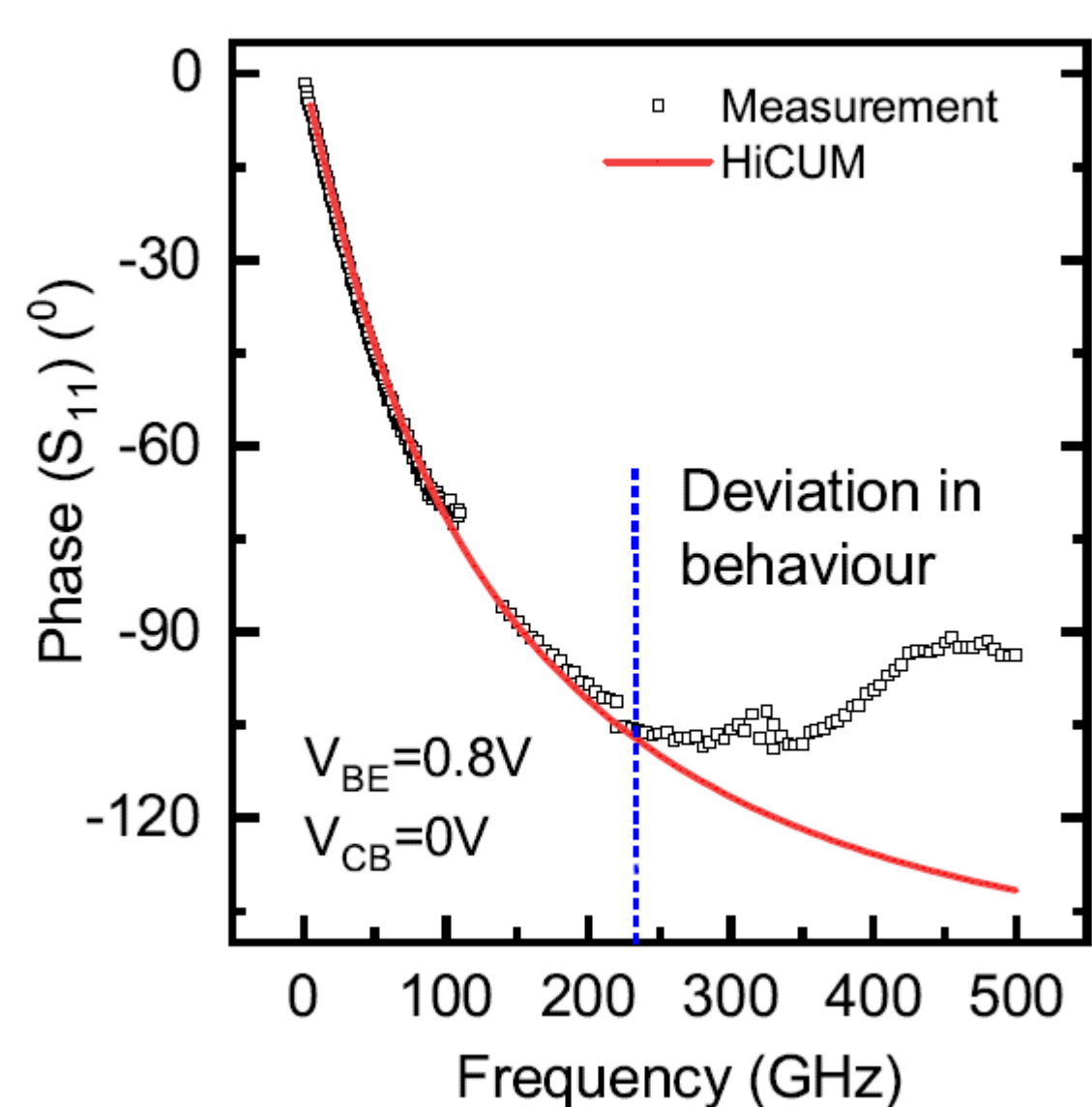
Soumya Ranjan Panda<sup>1,2</sup>, Sebastien Fregonese<sup>1</sup>, Marina Deng<sup>1</sup>, Anjan Chakravorty<sup>2</sup>, Thomas Zimmer<sup>1</sup>  
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## Introduction

Characterization above 110 GHz is still a challenge. So TCAD simulation has been done to estimate the measurements.



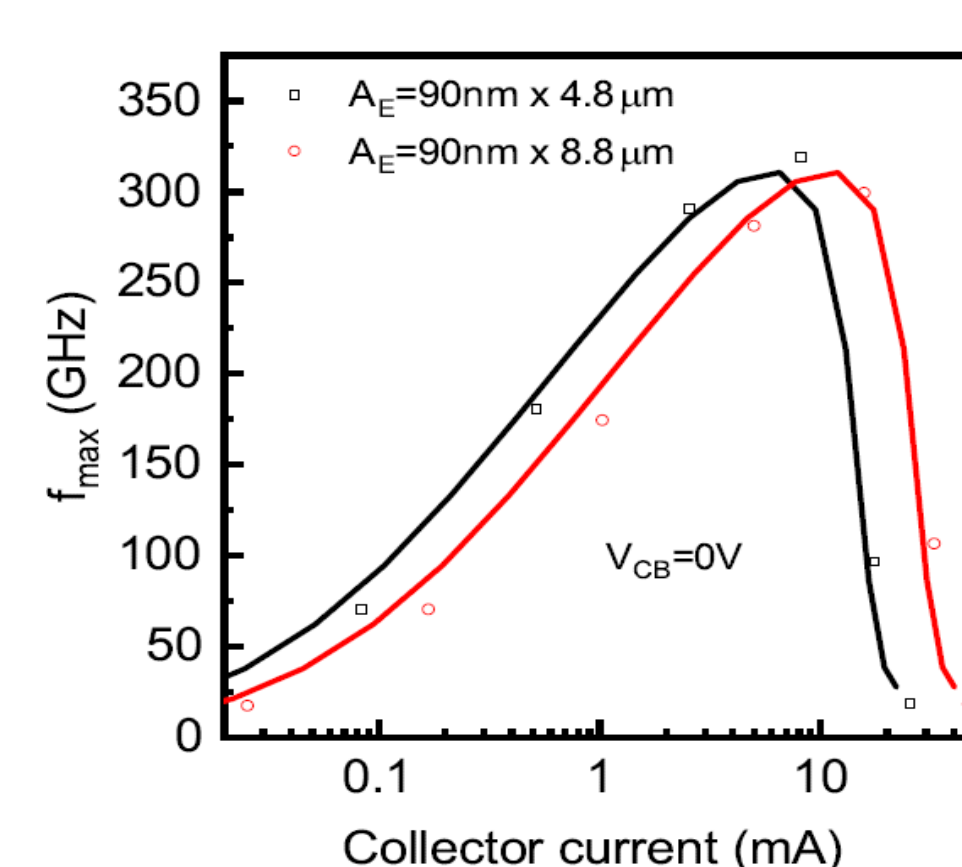
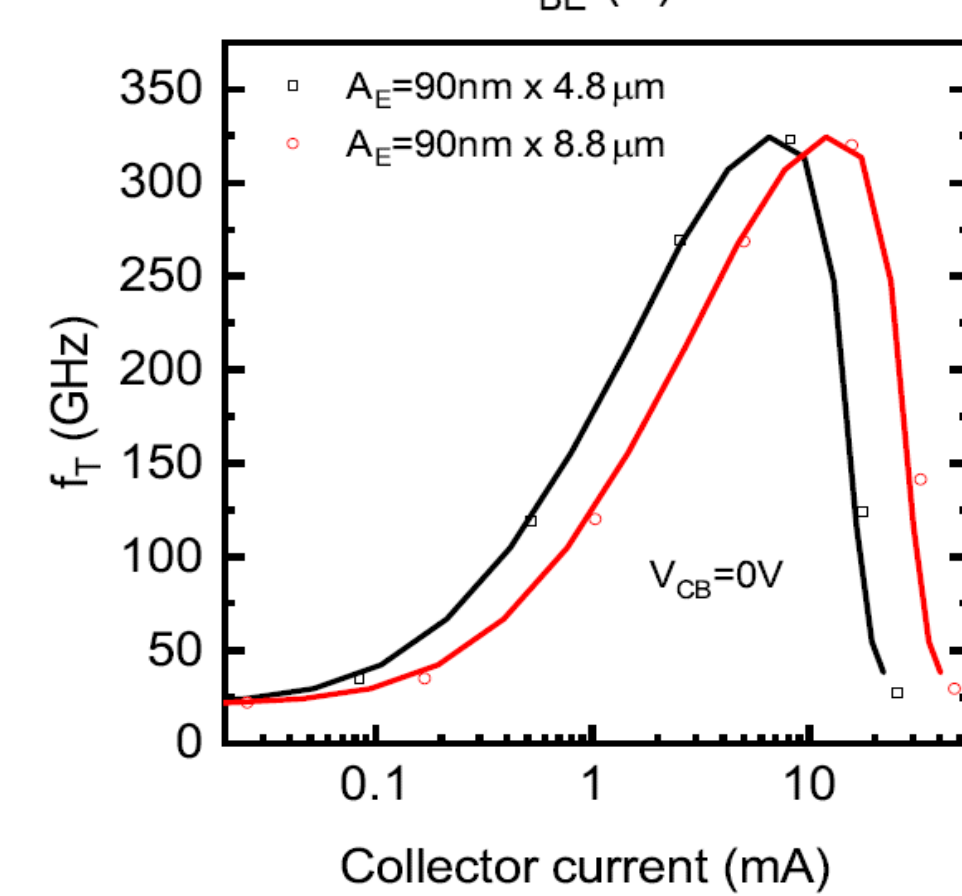
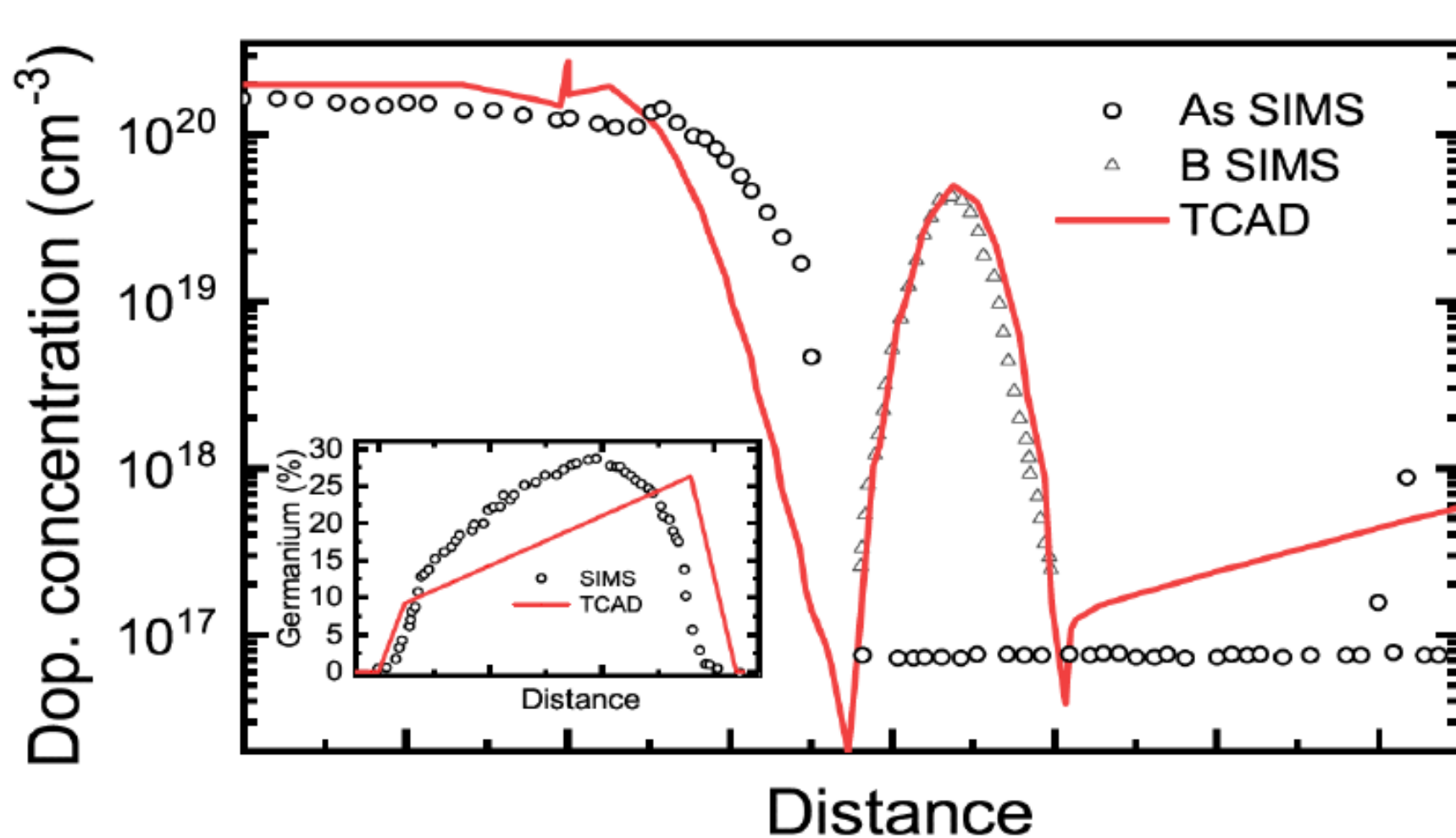
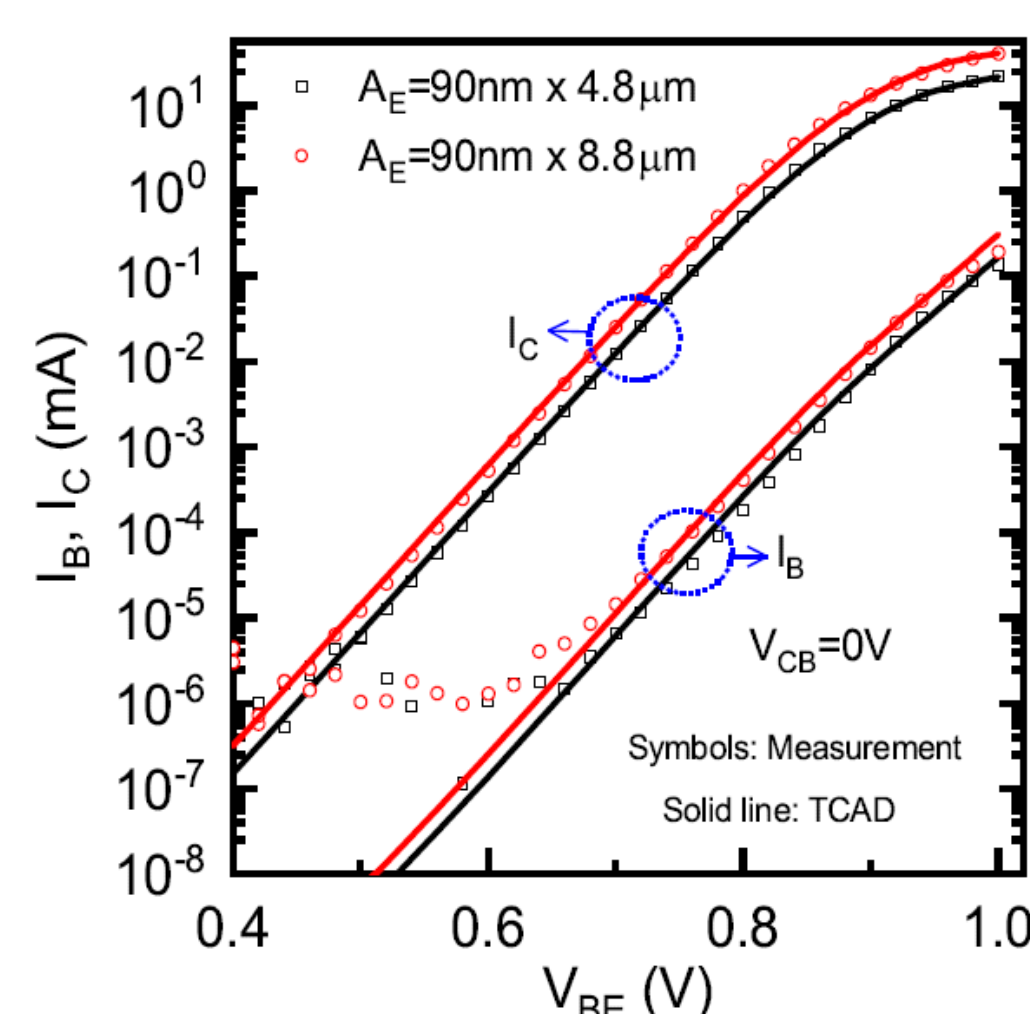
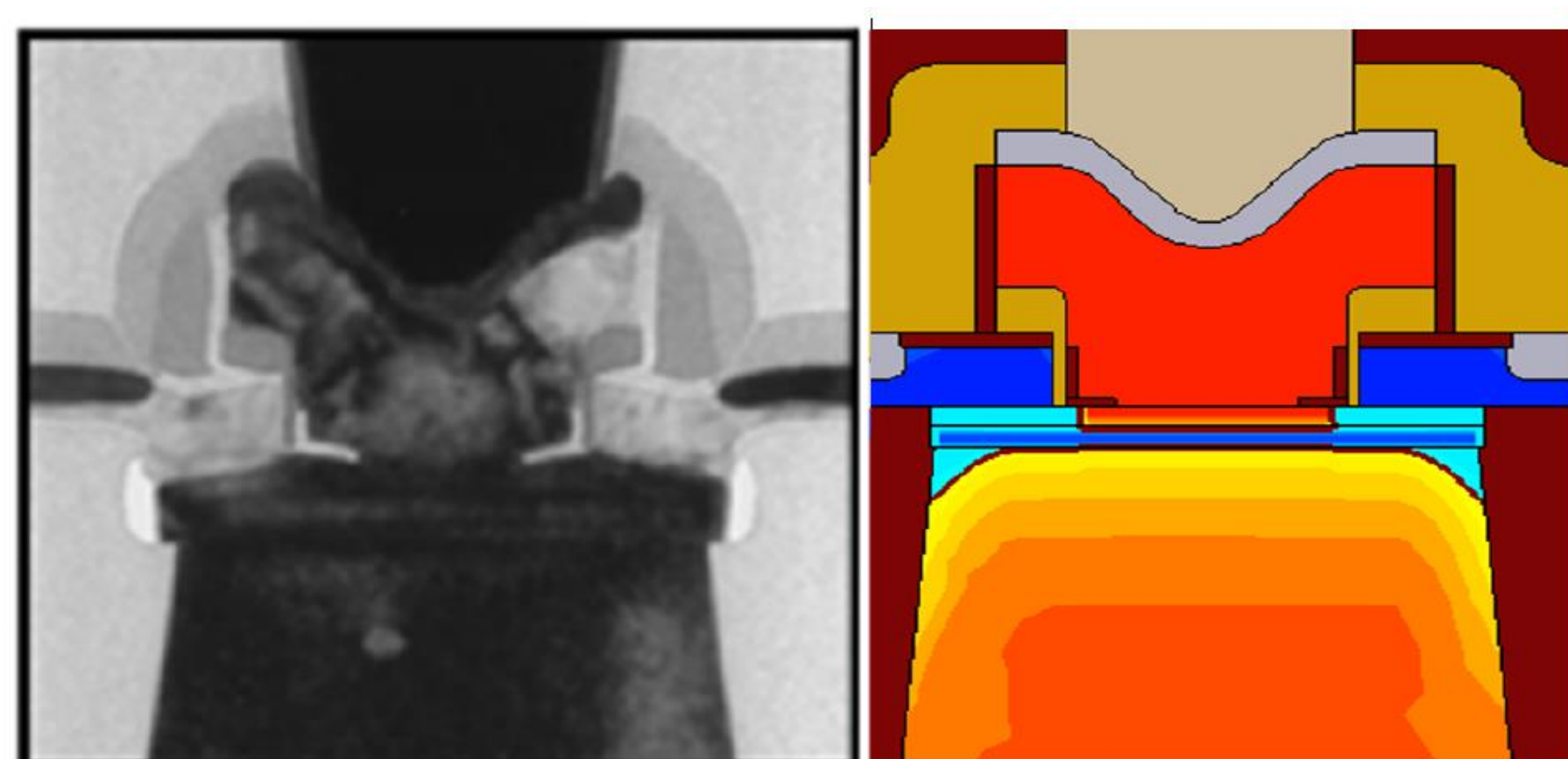
140-220GHz 220-325GHz



### Measurement Uncertainties !

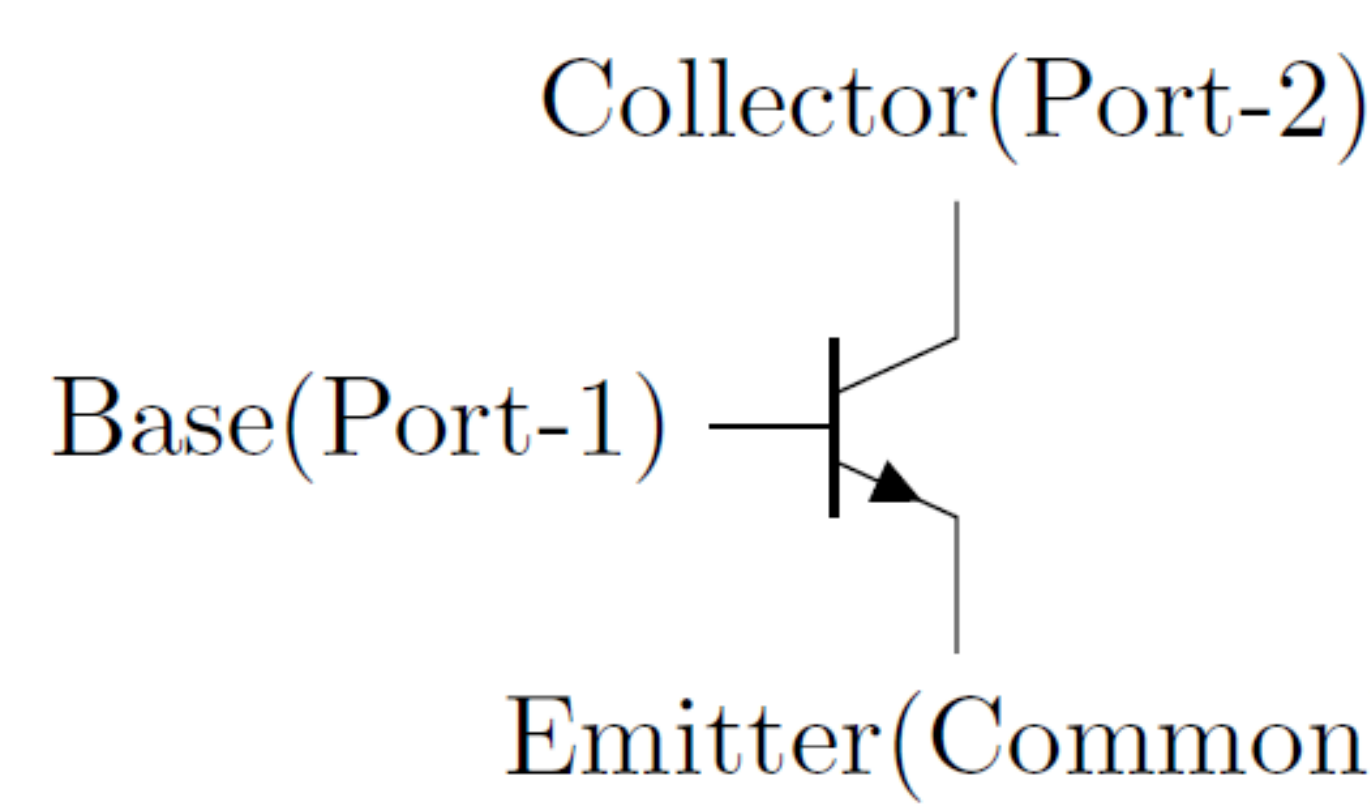
1. Probe positioning errors (Thru to Line)
2. Contact issue
3. Change of coupling

## TCAD Calibration

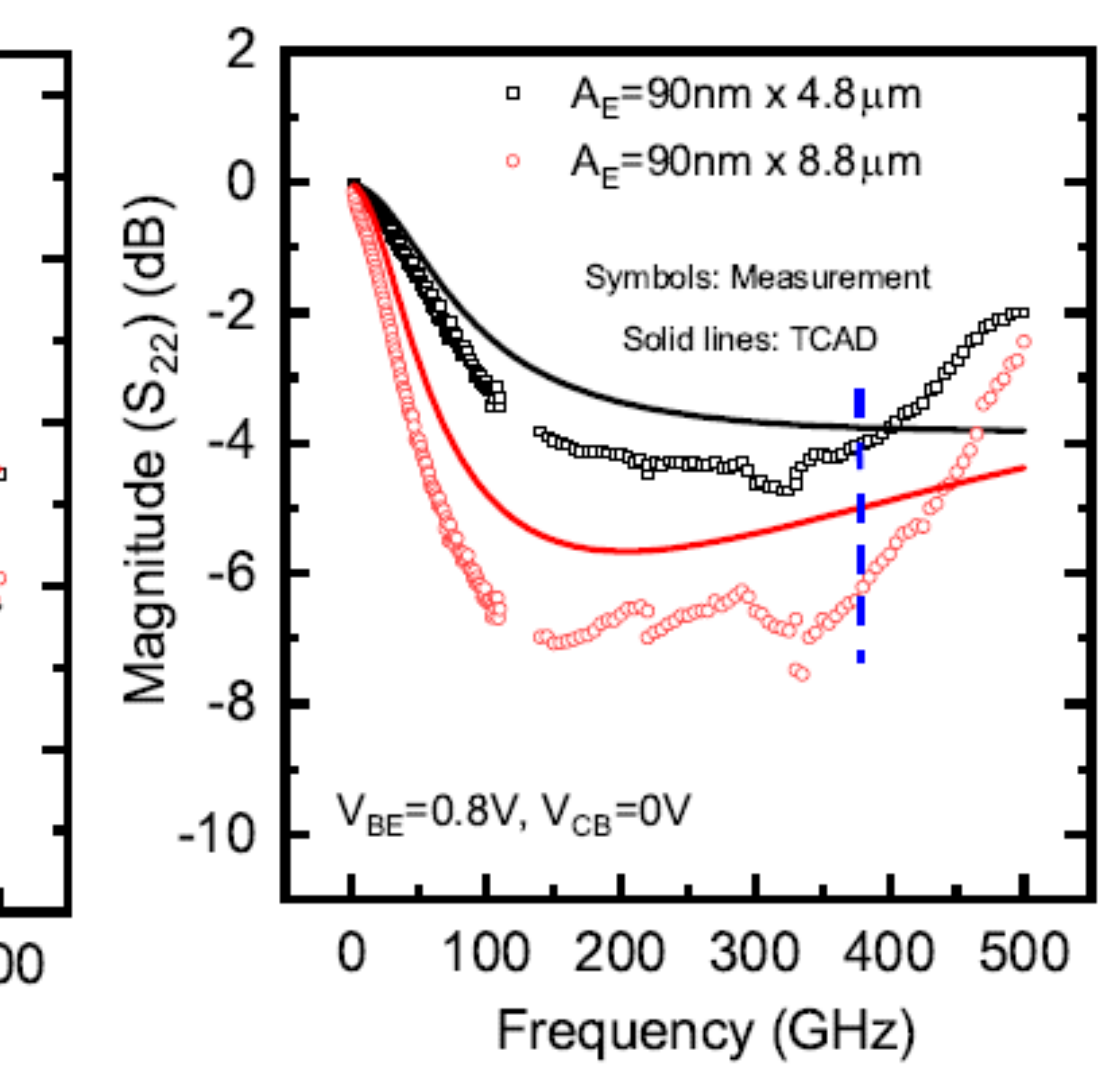
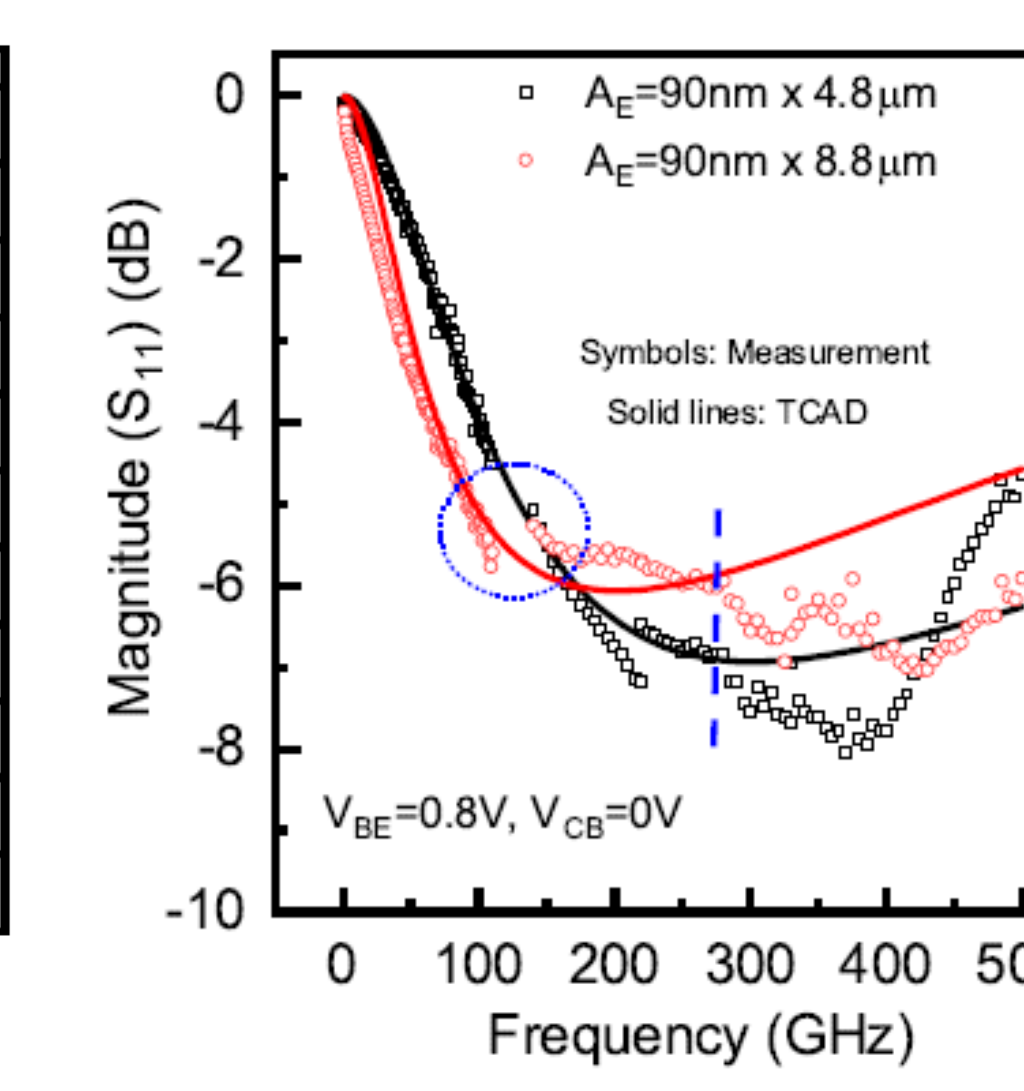
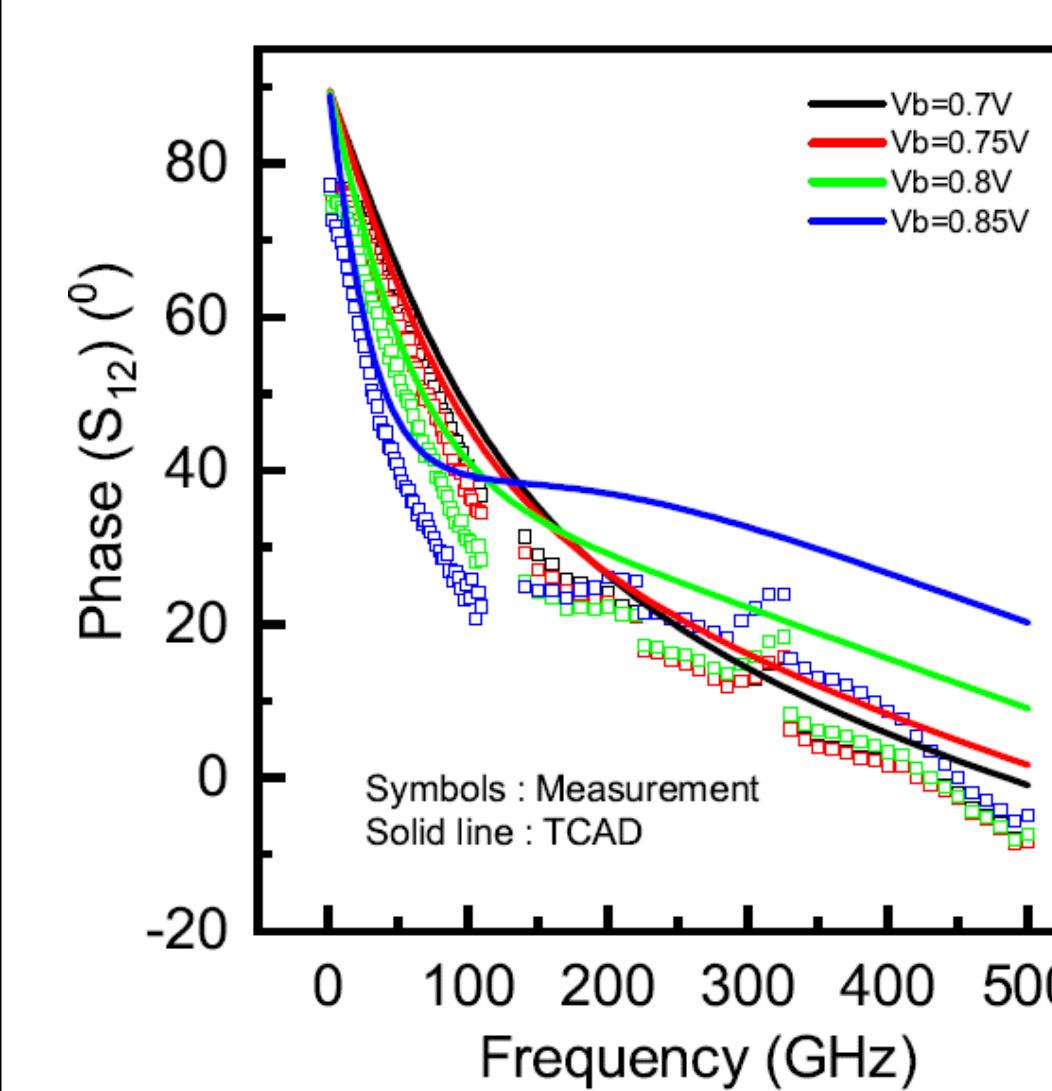
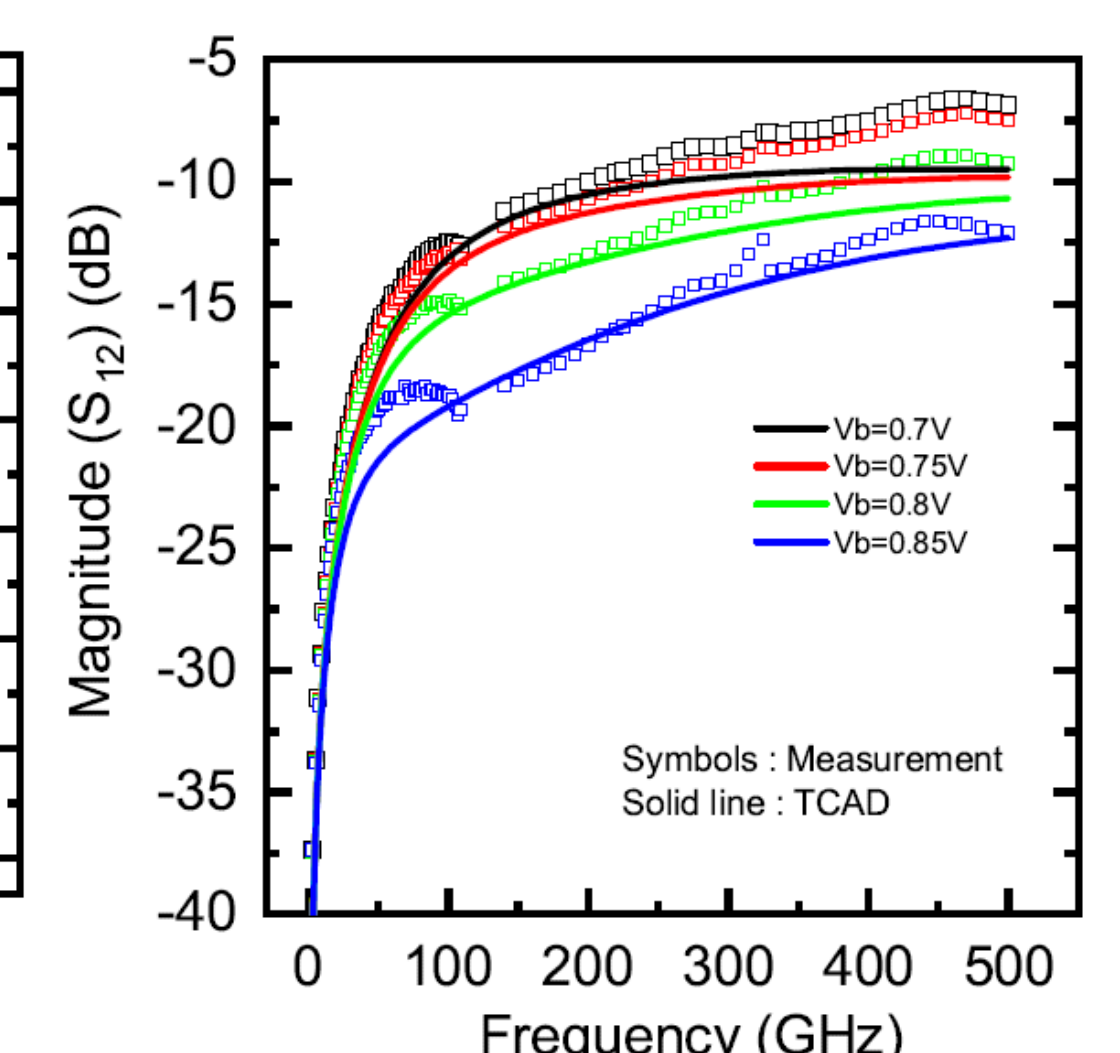
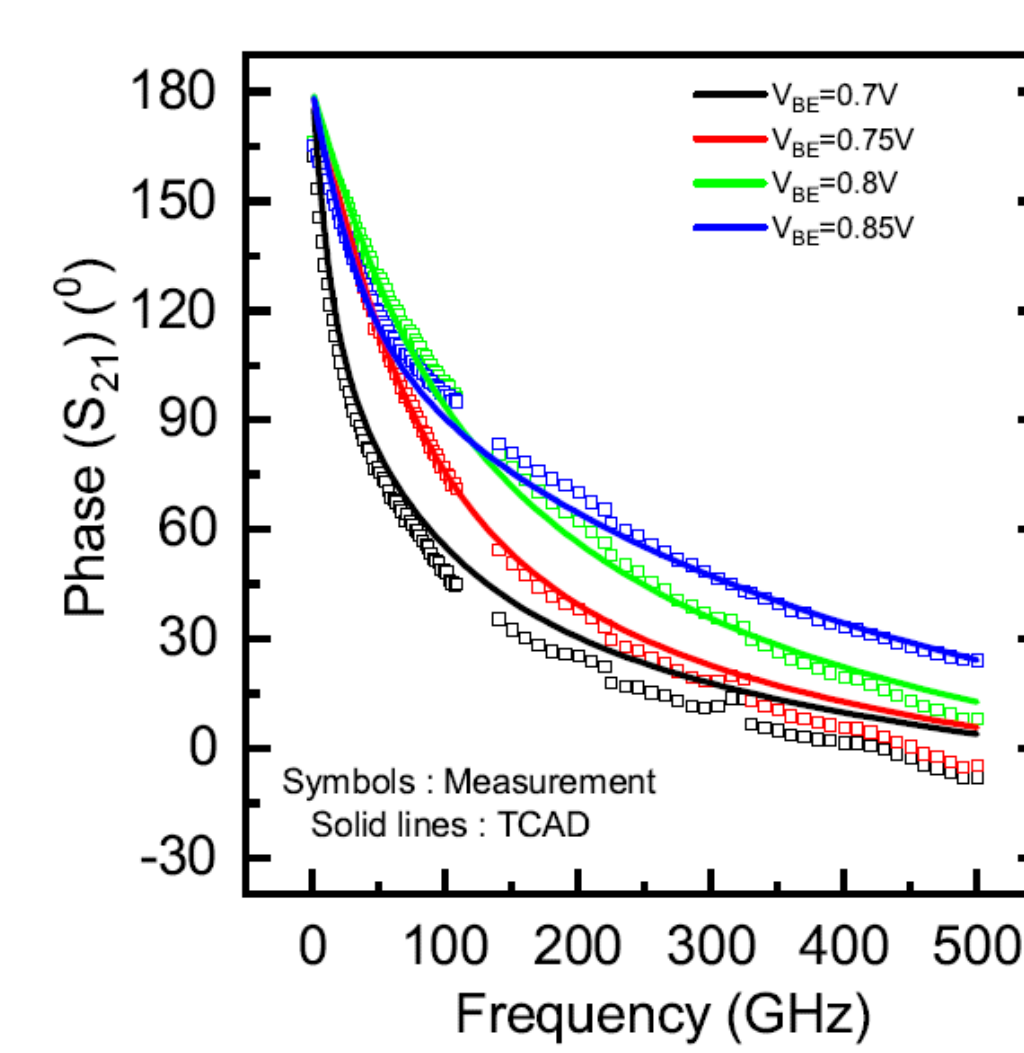
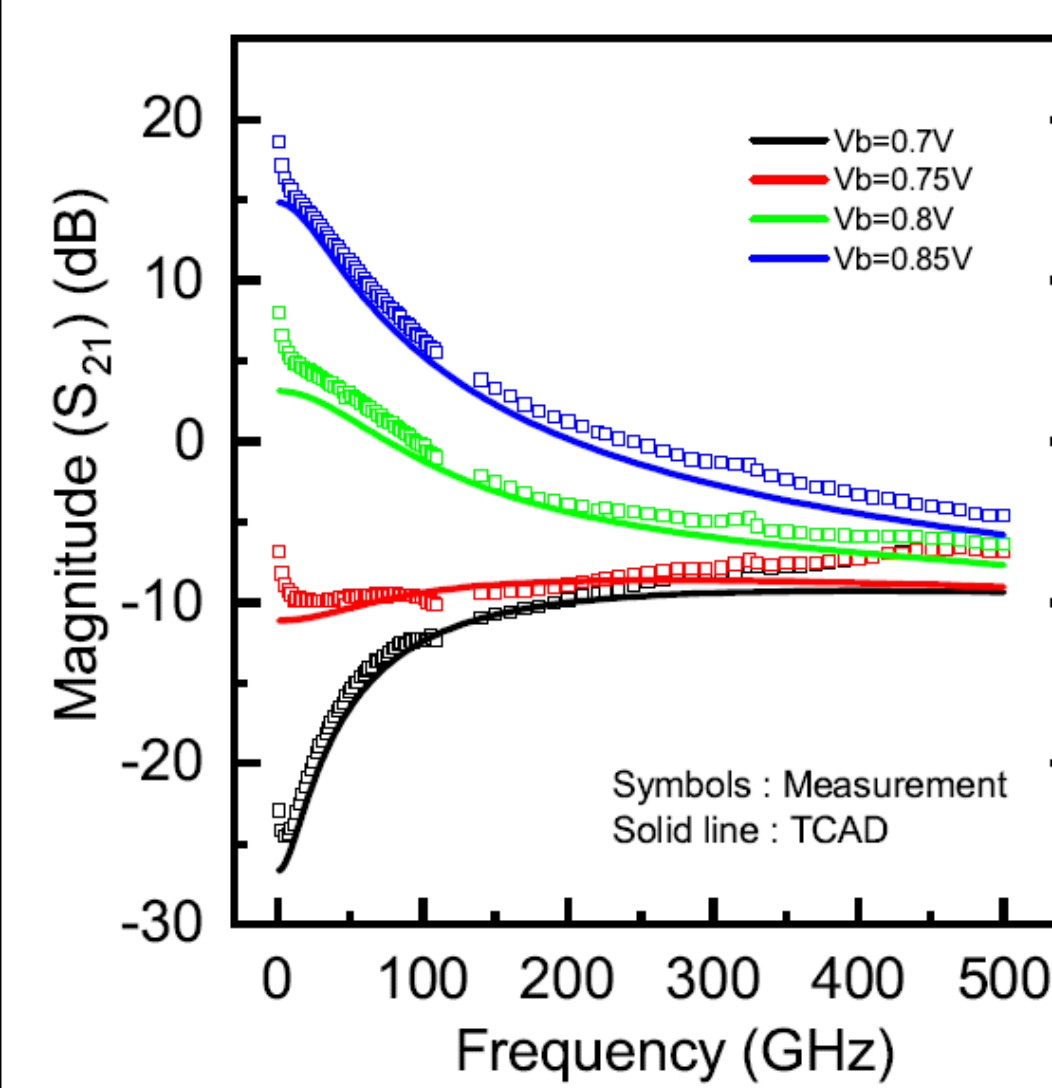
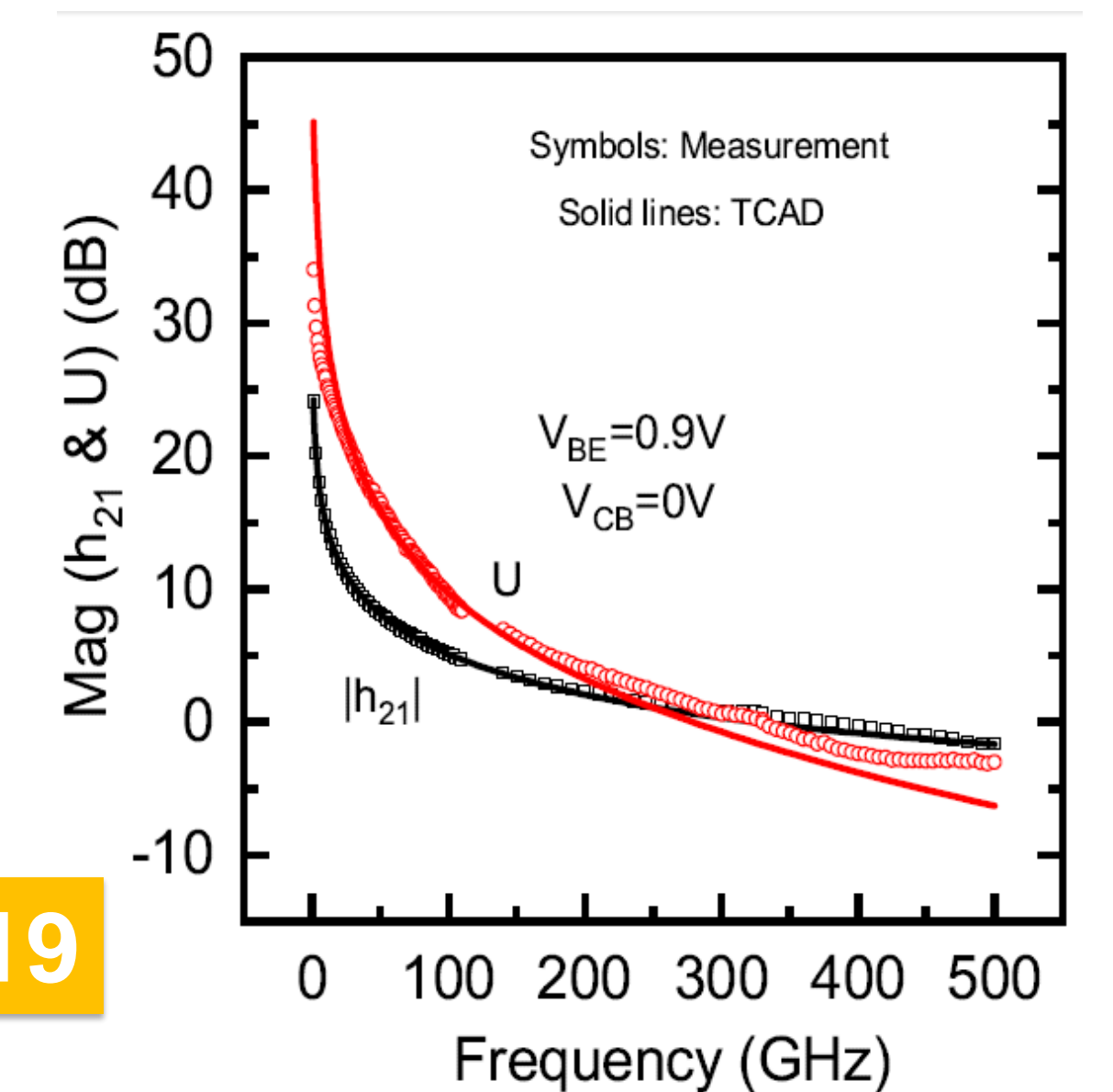


1. Device geometry as captured in the TEM image is reproduced in TCAD and simulated using verified models.
2. The device FoM are calibrated comparing with measurements.

## Results



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The comparisons are done w.r.t bias variation and device dimension variation.

## Conclusions

1. No clear upper frequency limit up to which the measurements are representing the intrinsic transistor (after de-embedding).
2. An urgent need for improvement of test structure design, calibration methodologies and de-embedding procedures when entering the THz domain.

## Acknowledgement

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## Bibliography

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