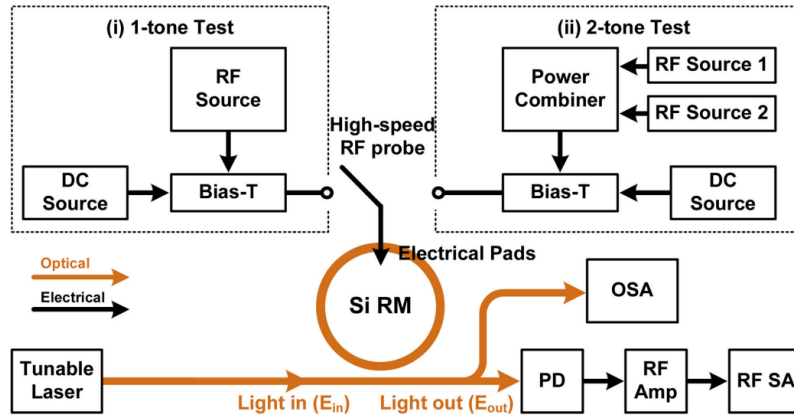
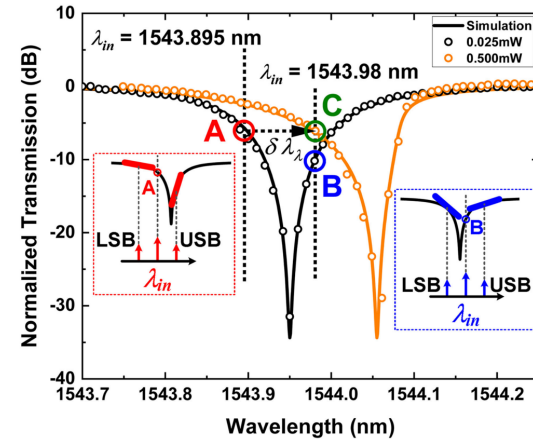


# Subject (1): Modulation Linearity

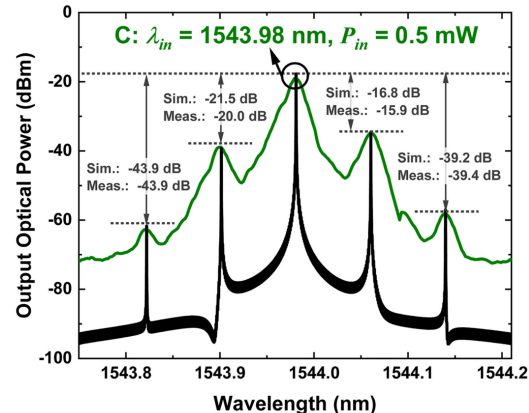
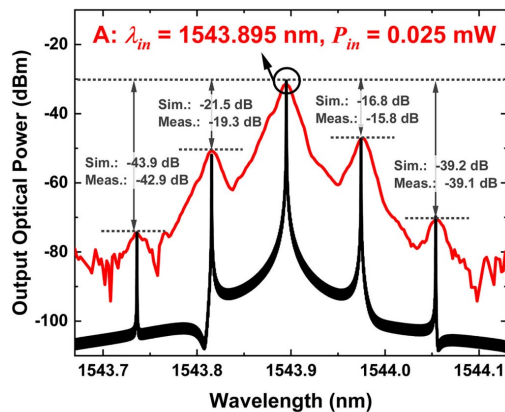
## Measurement Setup



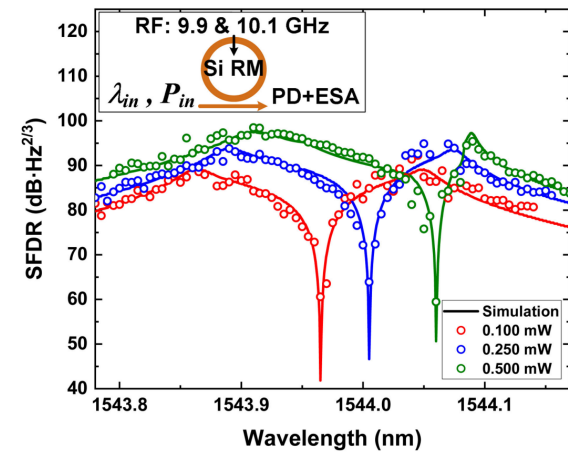
## Self-Heating



## Optical Domain



## SFDR Variation



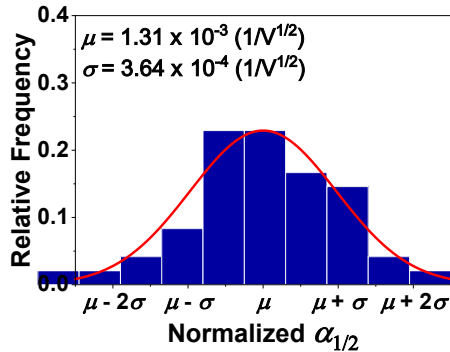
Published to *IEEE/OSA Journal of Lightwave Technology*

# Subject (2): Monte-Carlo Characterization

2021-1

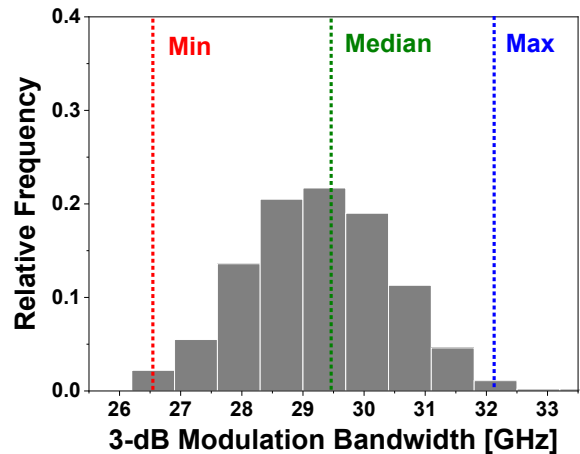
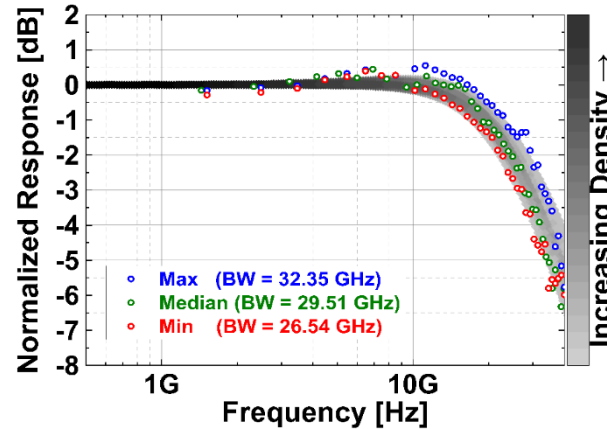
2021-2

## Parameter Statistics

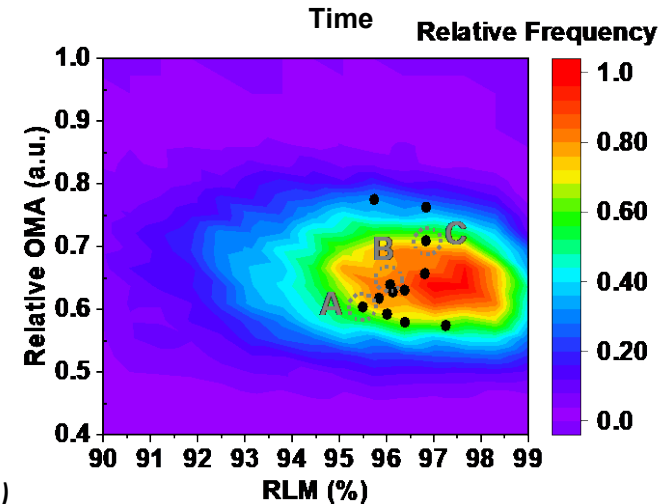
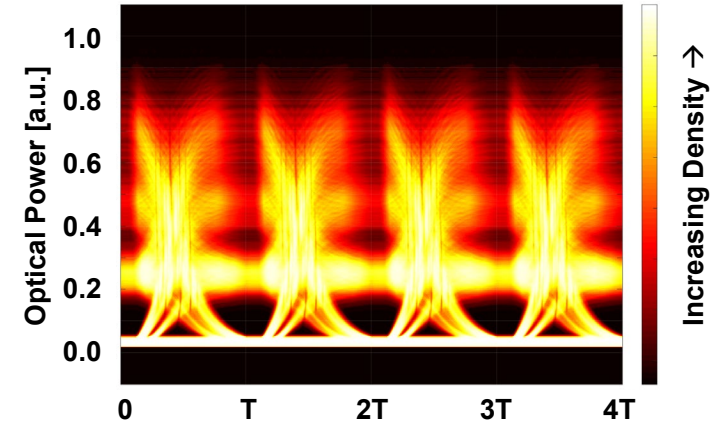


...

## Small-Signal Response



## Large-Signal Response

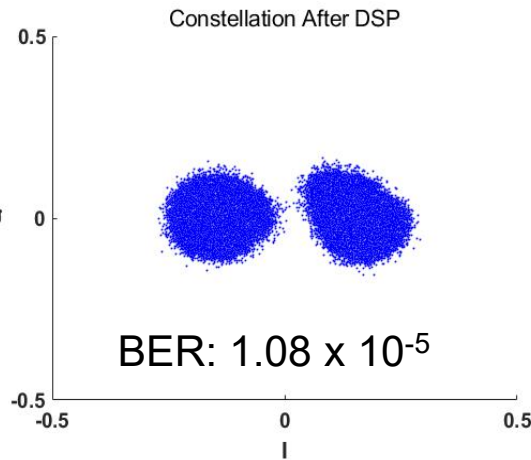
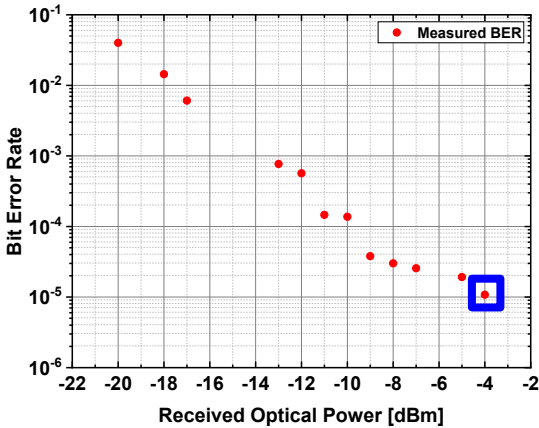


Published to *IEEE Group Four Photonics (GFP)*

# Subject (3): Coherent Optical Communications

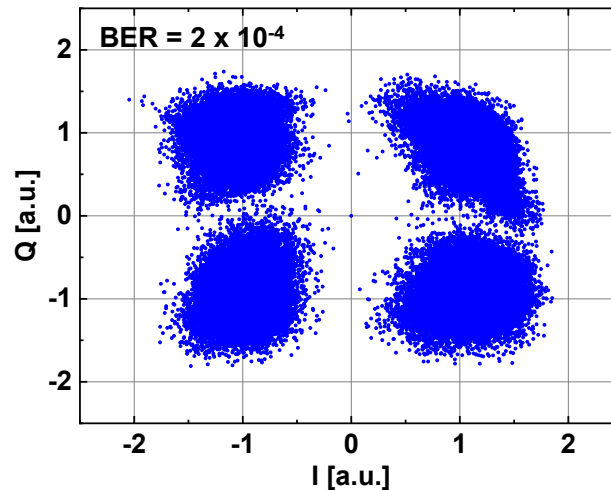
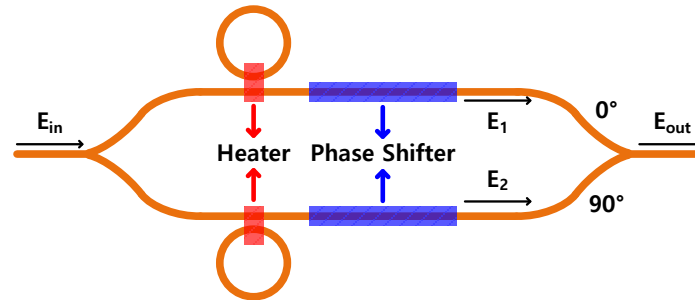
2021-2

## Si ring BPSK modulator



2022-1

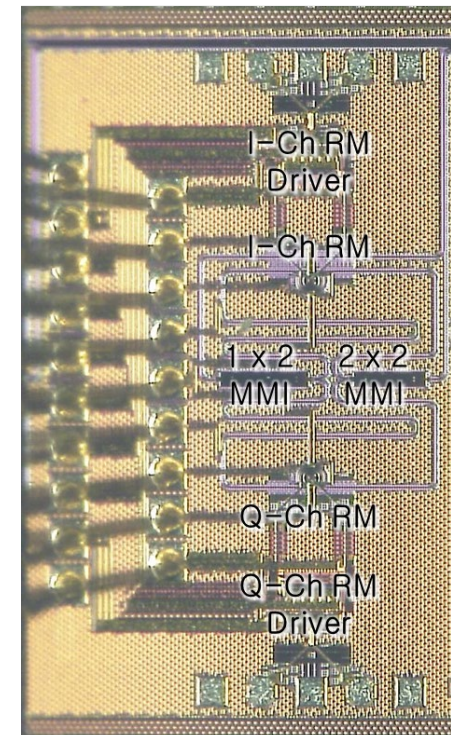
## Si ring QPSK modulator



2022-2

## Si Ring EPIC QPSK Transmitter

<Chip Micro-Photograph>



To be measured

# Previous and Future

## ● 2020-2

- Fab: imec iSiPP50G 1<sup>st</sup> chip (Si ring BPSK modulators)
- Equipment setup: real-time oscilloscope (MSOV334A), optical BPF, TLS, ...
- Measurements: modulation linearity of Si ring modulators

## ● 2021-1

- Fab: imec iSiPP50G 2<sup>nd</sup> chip (Si ring QPSK modulators)
- Publication: *“Modulation Linearity Characterization of Si Ring Modulators”*, *IEEE/OSA Journal of Lightwave Technology*, Vol. 39, No. 24, pp.7842-7849.
- Measurements: Monte-Carlo small-signal analysis of Si ring modulators
- Background research: digital signal processing for coherent optical communications

# Previous and Future

## ● 2021-2

- Measurements: 25-Gb/s Si ring BPSK modulators
- Measurements: Monte-Carlo large-signal analysis of Si ring modulators
- Publication: *“Parametric Monte-Carlo Characterization of Si Ring Modulators”*, *IEEE Group IV Photonics (GFP), Virtual Conference, 7-10 December 2021 (O)*.
- Chip-out: imec iSiPP50G 1<sup>st</sup> chip (Si ring BPSK modulators)

## ● 2022-1

- Measurements: 20-Gb/s Si ring QPSK modulators
- Measurements: online DSP algorithm for coherent optical PSK modulators
- Modeling: Monte-Carlo co-simulation of Si ring PAM-4 transmitters

## ● 2022-2

- ***Measurements: 50-Gb/s Si ring QPSK transmitters (EPIC)***
- ***Measurements: temperature control algorithm for Si ring PSK modulators***