2025 Workshop

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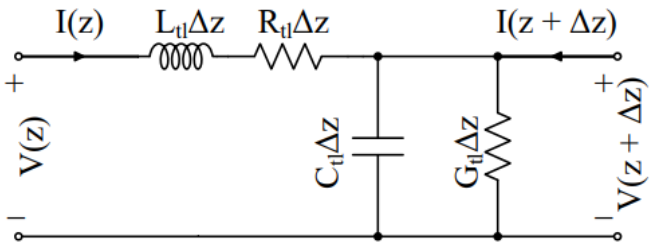
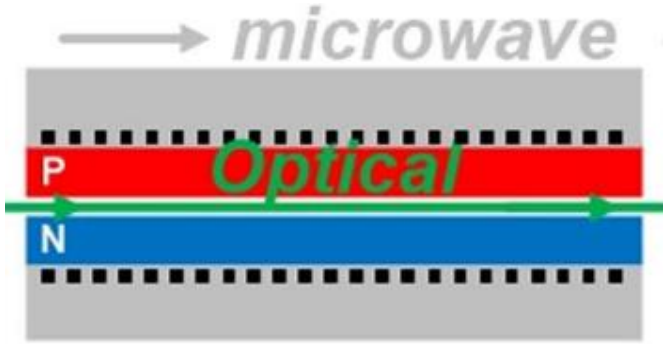
- Motivation for high speed MZM

Reverse bias PN junction → modulation efficiency ↓ → long phase shifter

TW(Traveling wave) MZM (λ << L)





$$Z_o \approx \sqrt{\frac{L}{C}}$$

$$n_{mw} = c\sqrt{LC}$$

- Impedance mismatch
- Velocity mismatch
- RF loss

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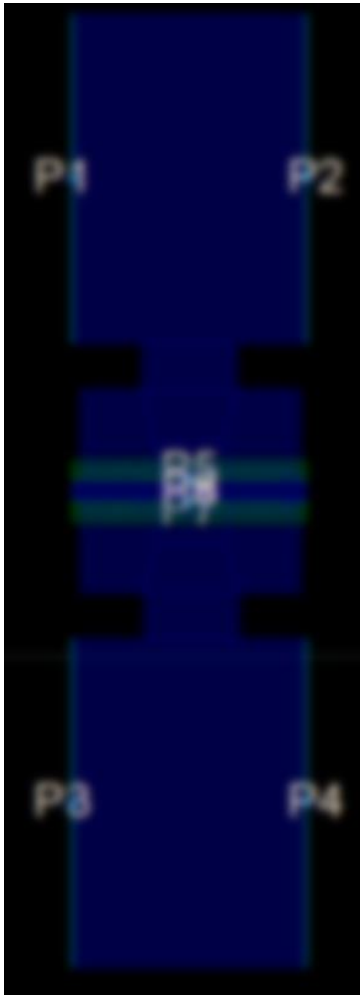
- TW MZM design study

1) Impedance matching

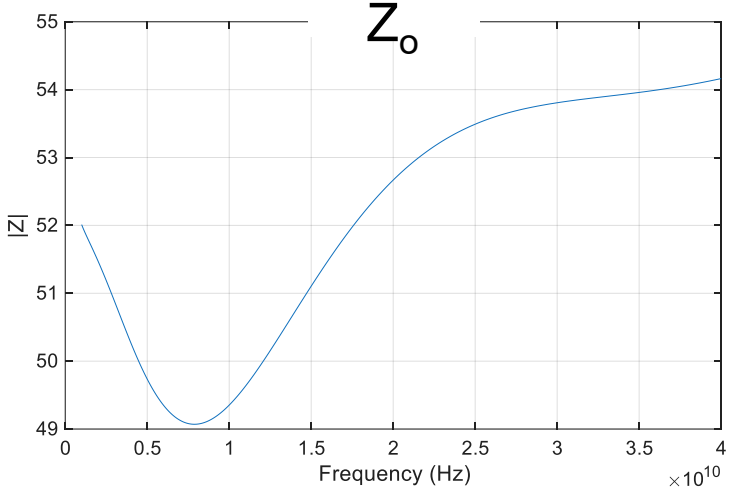
$$Z_o \approx \sqrt{\frac{L}{C}} \approx 50\Omega$$

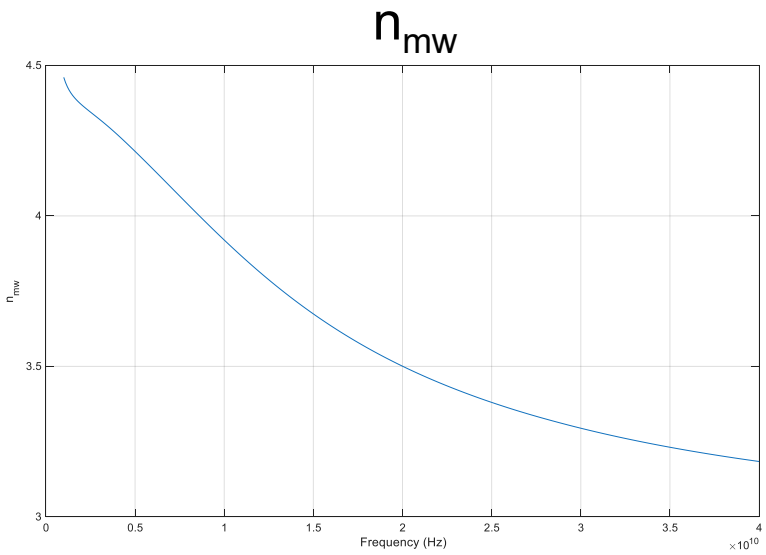
2) Velocity matching

$$n_{mw} = c\sqrt{LC} \approx n_g$$



ADS sim
(Electrode design)





MATLAB sim

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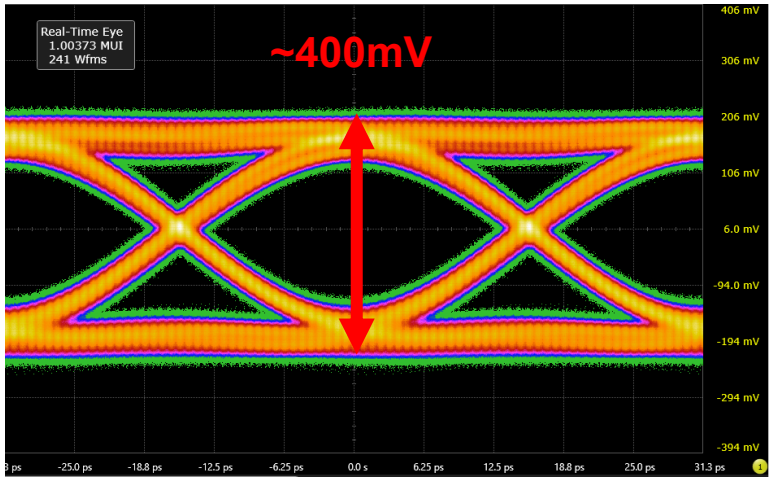
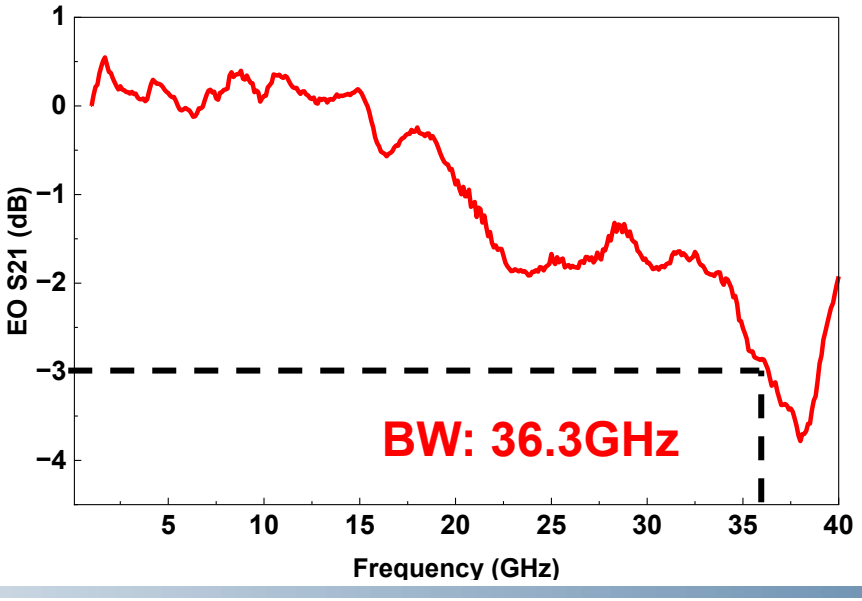
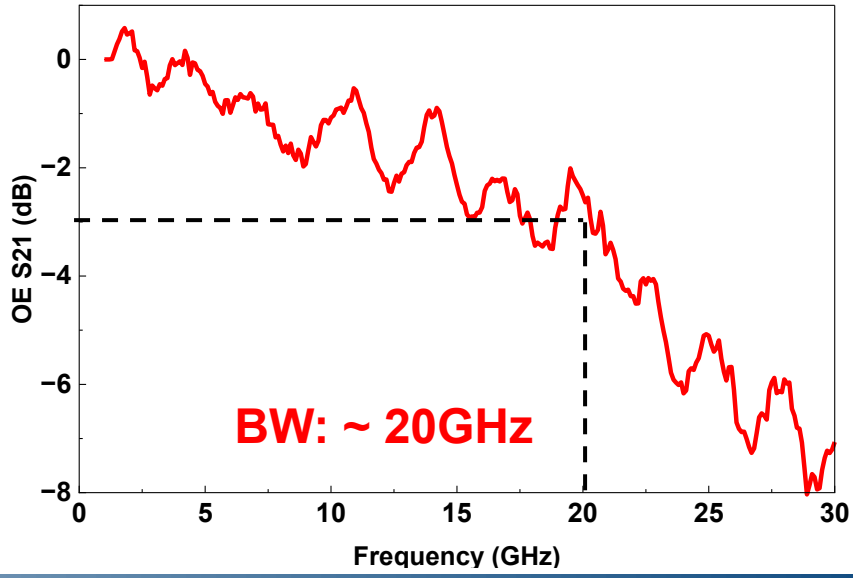
- TW MZM, PD Measurement

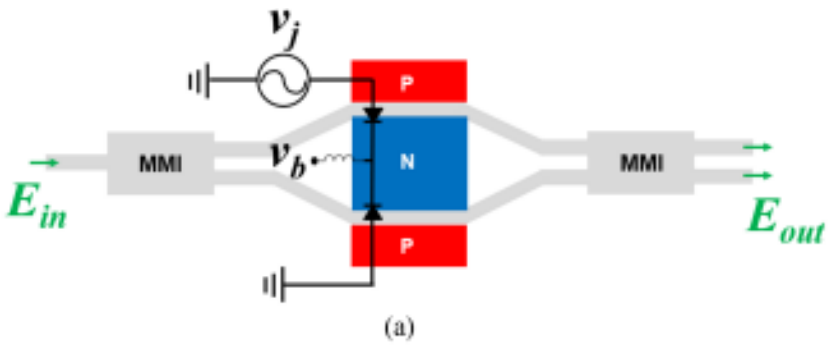






- TW MZM, BPD Design

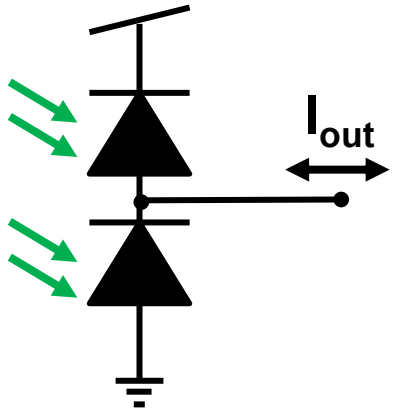
SPP(Single-Push-Pull MZM)



$$\alpha_{Sil} \propto f^2 C^2_{pn} R_{pn}$$

Pros : RF loss ↓

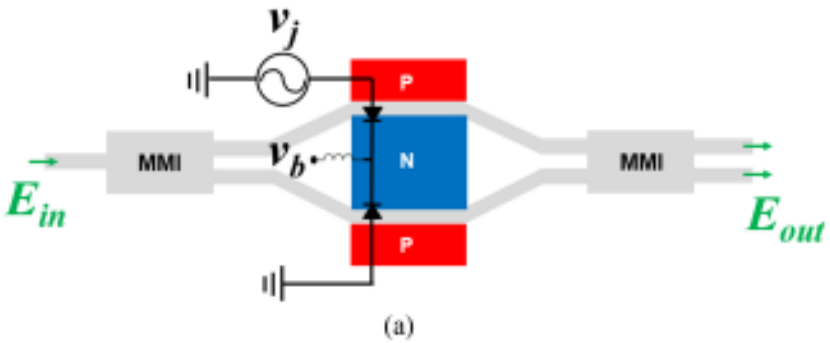
BPD(Balanced PD)

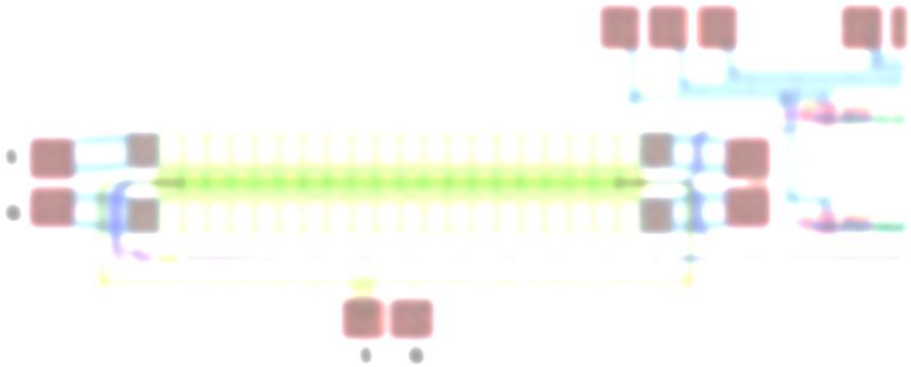


Pros : Common noise ↓

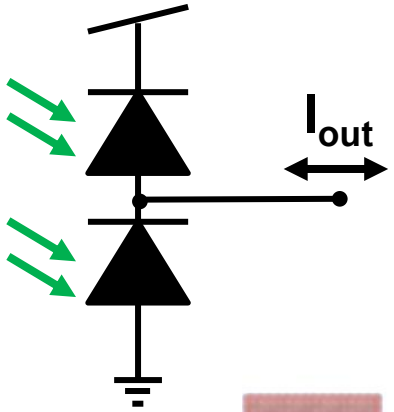
- TW MZM, BPD Design

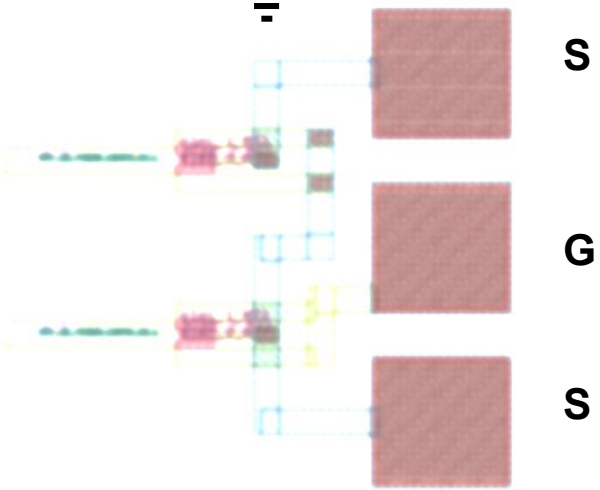
SPP(Single-Push-Pull MZM)





BPD(Balanced PD)





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- Chip design (26.05 AMF)