OpenPICs WP3

Agenda

Part I (start 14:00)

WP 3.1 BB Design   **Tue, Bright**
WP 3.2 PDK Content   **Smart, TU/e, Bright**
WP 3.3 BB Characterization   **Smart, TU/e**
WP 3.5 Demonstrator   **Technobis, Effect**

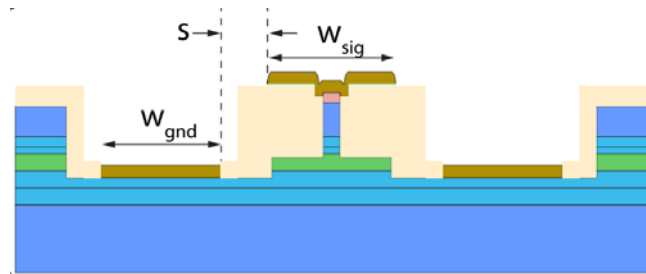Part II (start 15:00)

WP 3.4 Design Environment   **Phoenix, Bright, TUe**
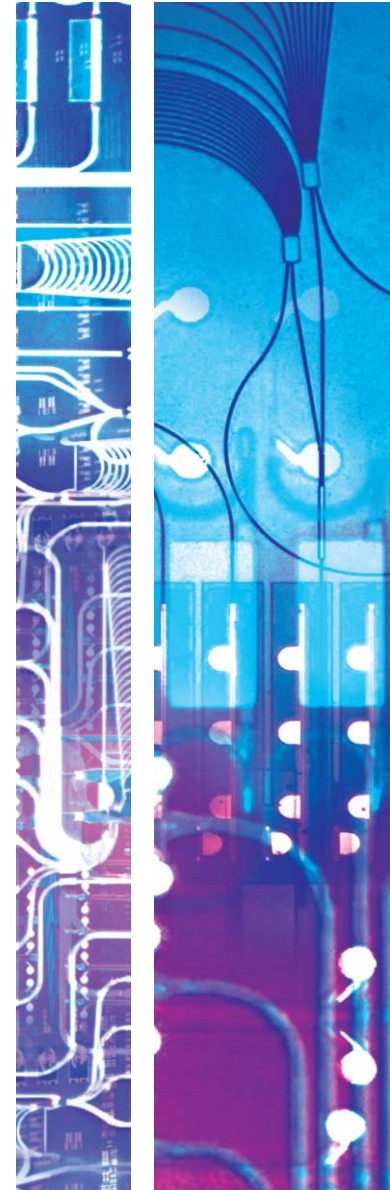
WP 3.1 BB Design – SP20 Modulator

- P-MQW stack from Effect used in passive WG in SP20
- Split batch with SI, plating, MQW stack
- Use of standard PDK for mask design
- Simulation and design phase now

- MWP schedule and its features (SP19 plating, no SI, SP20 SI, plating, MQW split batch, SP21 etc?)

WP 3.1 BB Design – SP20 Modulator

SOW MPW Active (MQW) - Passive - N substrate

Gain				Waveguide		
Material	PL	d [mm]		Material	PL	d [nm]
p-InP cap		20		p-InP cap		20
p-InGaAs	1650	280		p-InGaAs	1650	280
p-Q1.4	1400	10		p-Q1.4	1400	10
p-Q1.2	1200	10		p-Q1.2	1200	10
p-InP		1000		p-InP		1000
p-InP		300		p-InP		300
				InP		20
InP		240		Q1.25	1250	20
				InP		200
Q1.25	1250	210		Q1.25	1250	500
i-MQW(4)	1550	90				
Q1.25	1250	200				
InP		500				
InP	substrate					
Target PL wavelength:		1550		Target PL wavelength:		1250
		+/- 20 nm				+/- 20 nm

Core layers for Effect MQW
Simplified structure with
Tan delta or sigma
Permittivity

Reverse bias <-> index change
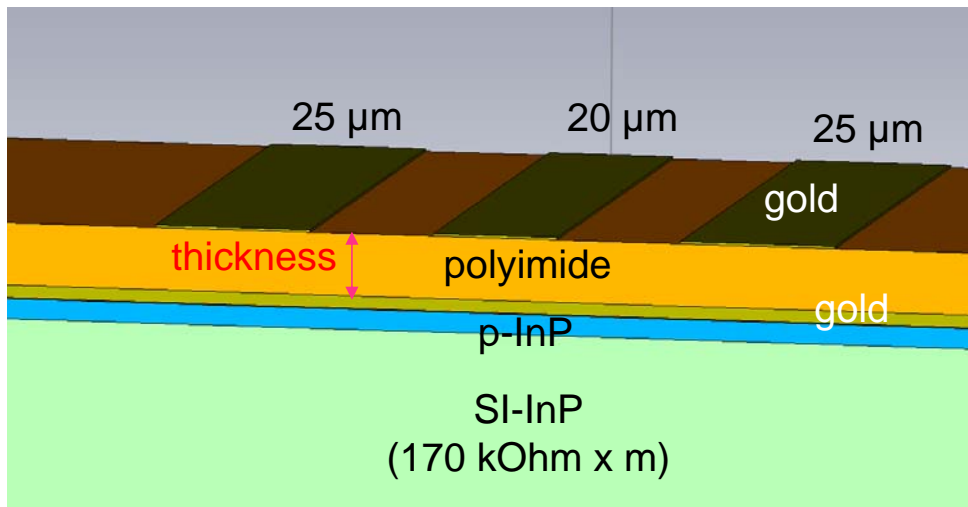Absorption/index change vs WL

JEPPIX

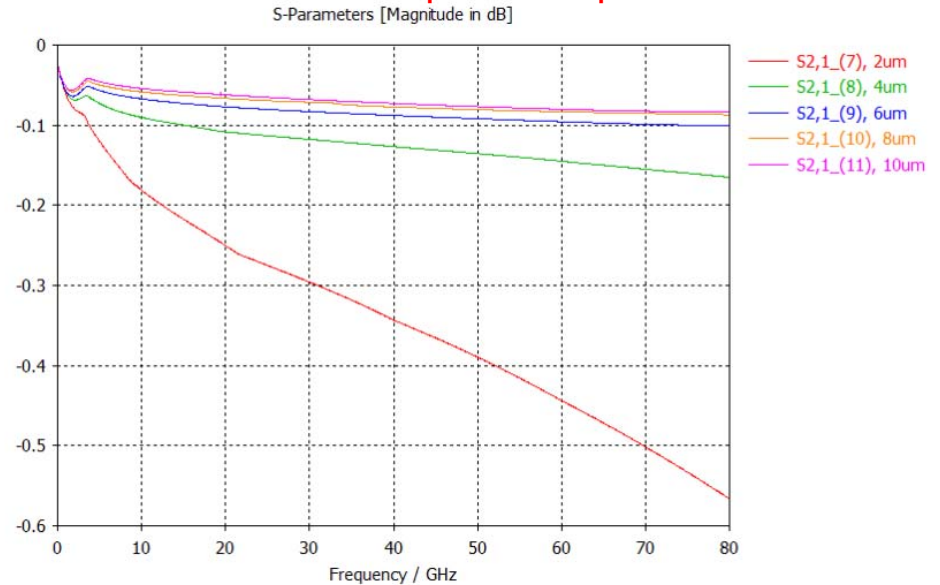# WP 3.1 BB Design – Al-MQW Material

- 3 types of MQW will be grown
  - P-MQW P-SCH, Al-MQW P-SCH, Al-MQW Al-SCH

- Tests with broad area laser masks to extract gain → ask smart

- MQW for EO interaction follows
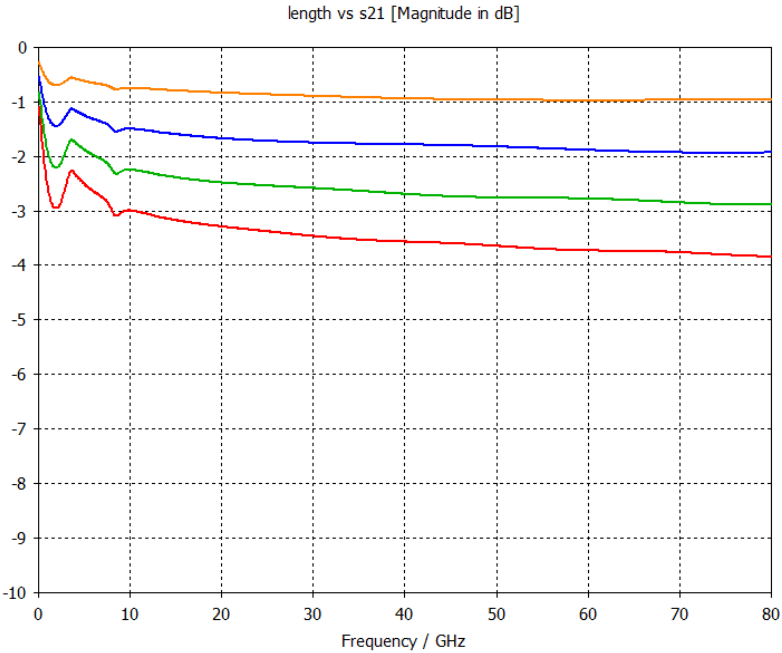
WP 3.1 BB Design – RF Lines

Thickness 2 μm → 10 μm
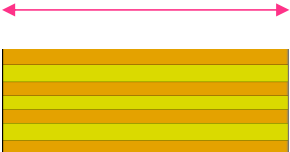

- 6 μm needed
- BCB experiments aim for that value now

WP 3.1 BB Design – RF Lines

length vs s21 [Magnitude in dB]

S2,1 ➞	4 mm
S4,3 ➞	3 mm
S6,5 ➞	2 mm
S8,7 ➞	1 mm

Changing line length


➢ 80 GHz bandwidth retained up to 3 mm length

DBR gratings and lasers in SP

-analysis of simulation tools (Lumerical, Meep)
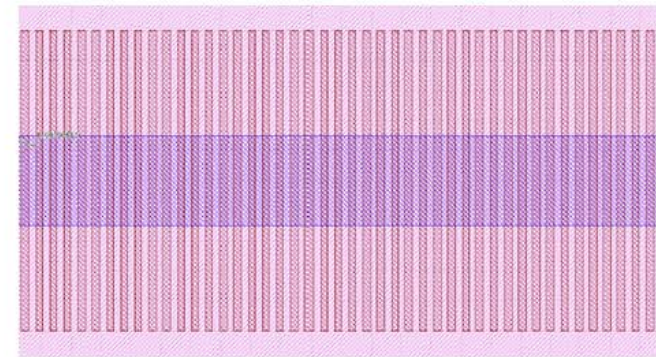-design procedure aligned with Smart (Luc)

SP 20 mask:

1. Test structure for DBR gratings characterization
 - alignment of work with Tue (Xaveer and Dan)
2. Test structure for tuneable DBR laser
3. Test structure sampled DBR grating (SG DBR)

Tue mask design for DBR characterization
To learn from and to align with Dan
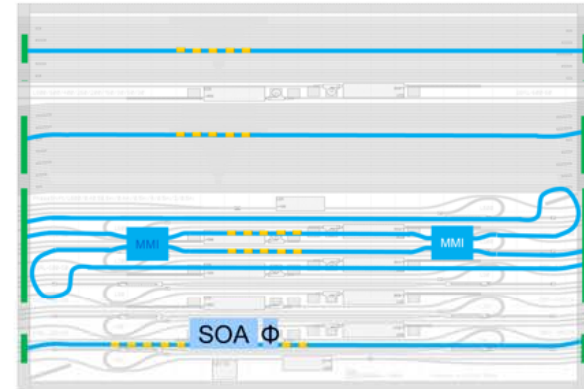
DBR grating design using Nazca

WP 3.1 BB Design

- Tunable laser developments? Target in SP20?

- Filter developments?

- Lionix:
  - Processing of designs
  - Hybrid assembly with InP
  - Bright takes lead in design

- Updates on SSC?
- Other comments?

WP 3.2 PDK Content and WP 3.3 BB Characterization

- Collection of available data for BBs
- Creation of repository for measurement data exchange

- BB test cell design for SP20
- BB test procedure definition

- Compact models: document what we mean with that

| R2 | Compact Models | Descripbe workflow and concept of compact models | 1x | Phoenix | Marcel | Bright, Smart, TU/e | | |

- Other comments?

WP 3.5 Demonstrator Design

- Open issues?
- Deliverables on concept end of M6 2017

WP 3.5	Demonstrator Design							Year 1	
number	M or R title	Description	items	Responsible					
R0	400G Transmitter concept, design and analysis	Detailed report on concept and chip architecture. Simulation and analysis results with final design proposal	1x	EFFECT	Saeed	TU/e, Bright, Smart			
R1	Fiber sensing chip concept, design and analysis	Detailed report on concept and chip architecture. Simulation and analysis results with final design proposal	1x	Technobis	Pim	Bright, TU/e, Smart			

BREAK

WP 3.4 Design Environment

- Last time: activities of Phoenix in WP3 openPICs

- Accessing spt files: Bright/Phoenix solved

- Milestone planning based on existing list

- Phoenix personnel at TU/e

- Documentation of design workflow HHI/Smart