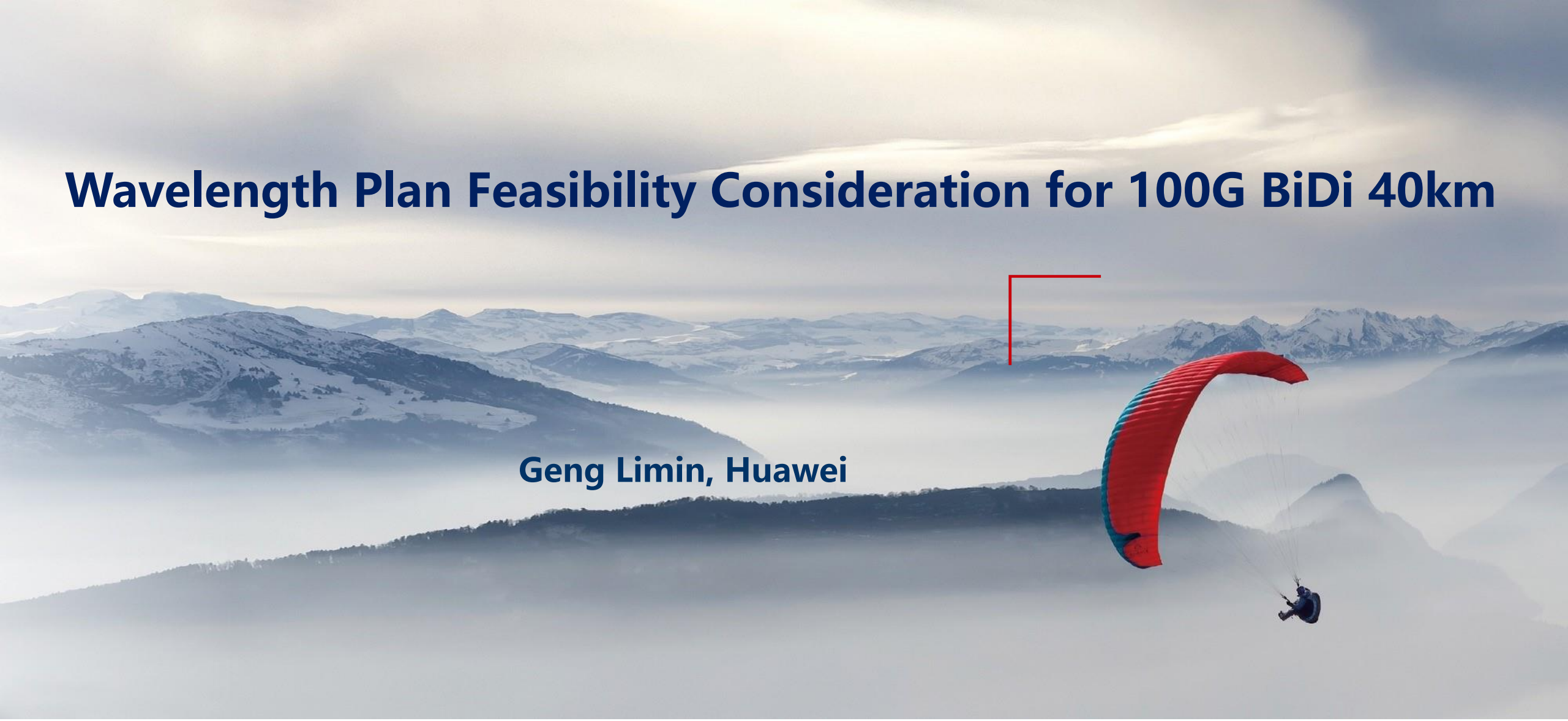
Wavelength Plan Feasibility Consideration for 100G BiDi 40km



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Supporters

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- Yun Xiang- FiberHome
- Song Mengyang- Accelink

100G Bidi 40Km Recap

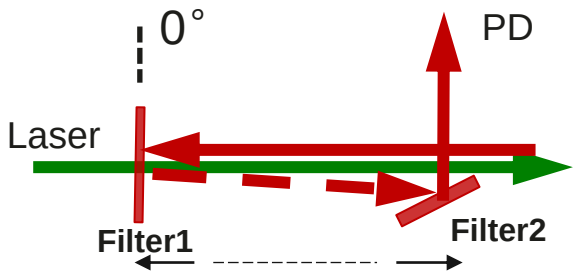
- 1304.6nm and 1309.1nm have been discussed in the earlier dk meeting as the operating wavelength for 100G BiDi 40 km

- The wavelength plan feasibility analysis of 100G BiDi 40 km is still lacking.

- In this contribution, wavelength gap feasibility and CD penalty will be discussed

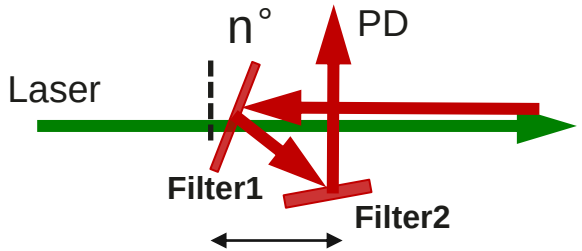
Wavelength Demultiplexing Design Factors

Ideal condition:
0° incident angle



BOSA length: infinite long

feasible condition:
13° incident



Feasible length of BOSA

Wavelength gap achievability is determined by the following factors:

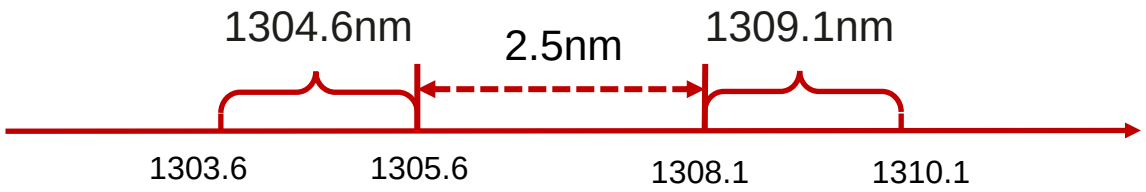
- Filter angle design
- Filter mechanical assembly tolerance
- λ Incident angle control accuracy

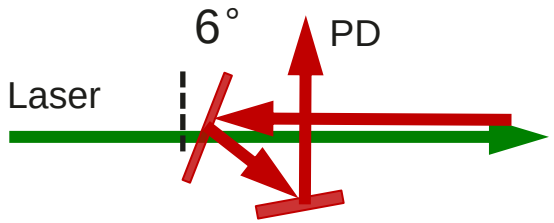
Filter design angle	Ideal Wavelength Gap (nm)	Filter Transmission Curve Deviation for λ Incident Angle Control Accuracy (nm/°)	Filter Mechanical Assembly Tolerance (°)	Incident λ Angle Control Tolerance (°)	Practical Wavelength Gap (nm)
	A	B	C	D	A+B*(2C+D)
0 °	1.4nm	0.2nm	0.5 °	0.2 °	1.64nm
13 °	3nm	1.7nm			5.1nm
45 °	12nm	5.0nm			18nm

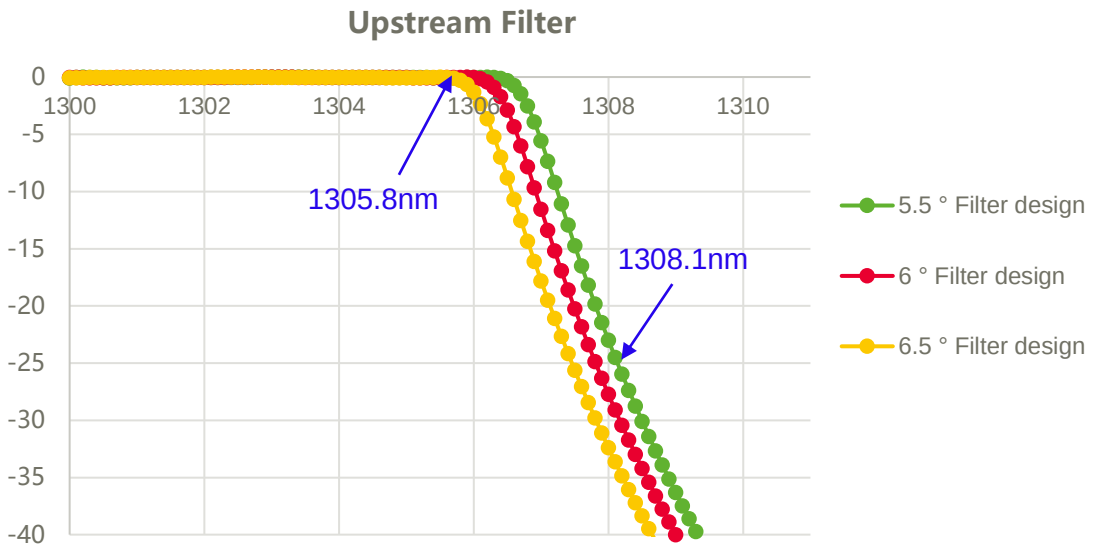
The Achievable Wavelength Gap

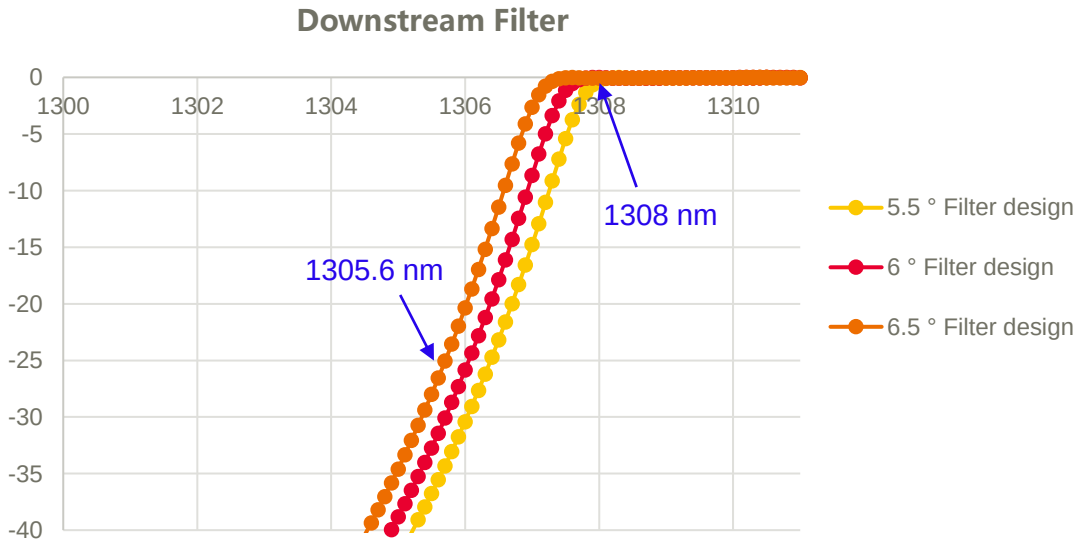
Wavelength gap analysis:

- For the proposed wavelength range of 1304.6nm and 1309.1nm , the narrowest wavelength gap is 2.5nm





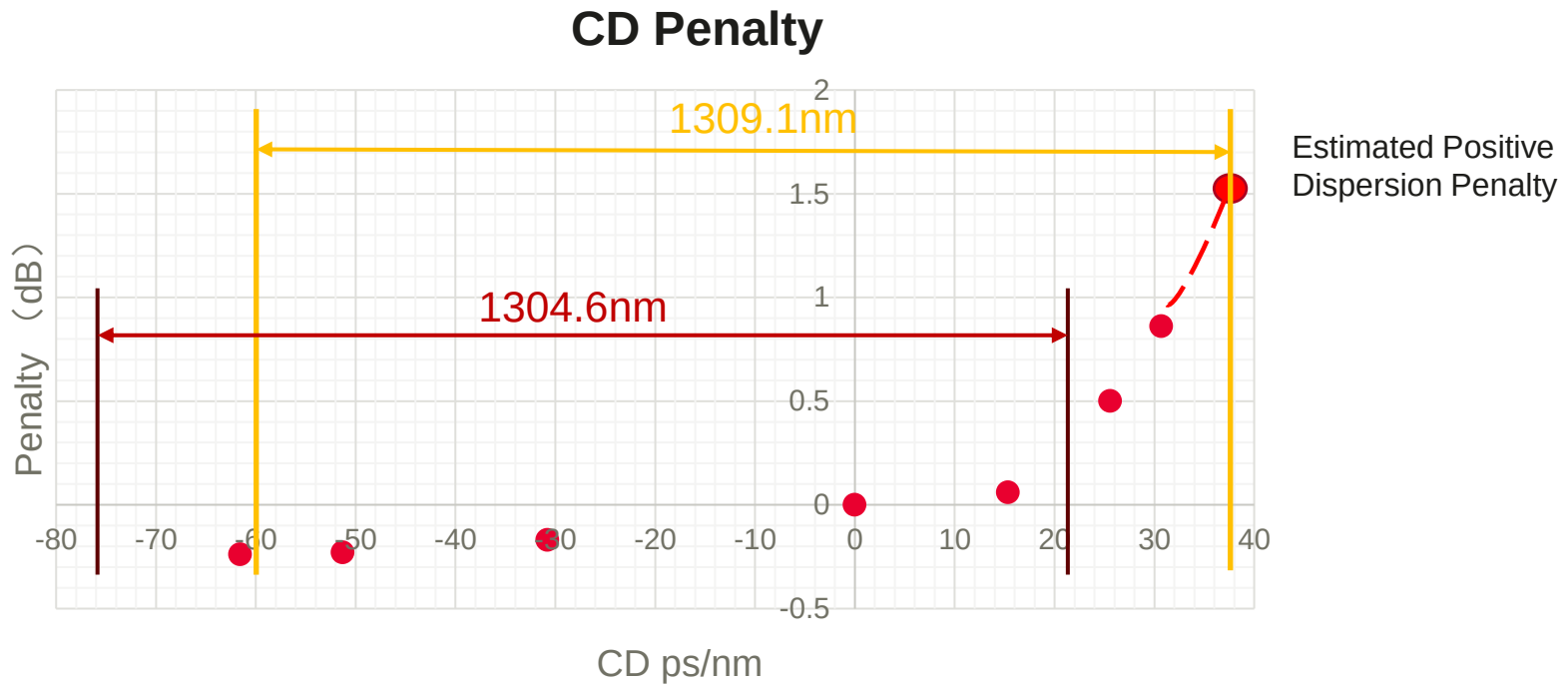




- 6° filter angle design can meet the requirement of the wavelength gap for 100G BiDi 40Km

CD Penalty Analysis

- In the 40 km scenario, CD range of 1304.6nm is -77.7ps/nm to +20.7ps/nm, CD range of 1309.1nm is -60.5ps/nm to +37.3ps/nm
- One 100G ER1 module was tested, results are as follows
  - The max positive CD penalty is around 1.5 dB@37.3ps/nm
  - The max negative CD penalty is 0.24 dB@-77.7ps/nm
- The affect of chirp was not considered in this test, further study on chirp should be conducted



Summary

- Based on filter design analysis, 1304.6 nm and 1309.1 nm can be achievable with 6° filter angle design of the BOSA

- The CD penalty results are
  - The max positive CD penalty is 1.5 dB @ +30.7ps/nm
  - The max negative CD penalty is 0.24 dB @ -77.7ps/nm

- It seems the wavelength plan for 100G BiDi 40 km is doable when considering the BOSA design, but the CD penalty margin is kind of tight

- Further study is needed to verify the technical feasibility

Thank you.