Channelmania!

Future proof your DWDM network topology
while keeping it flexible for 1.6T

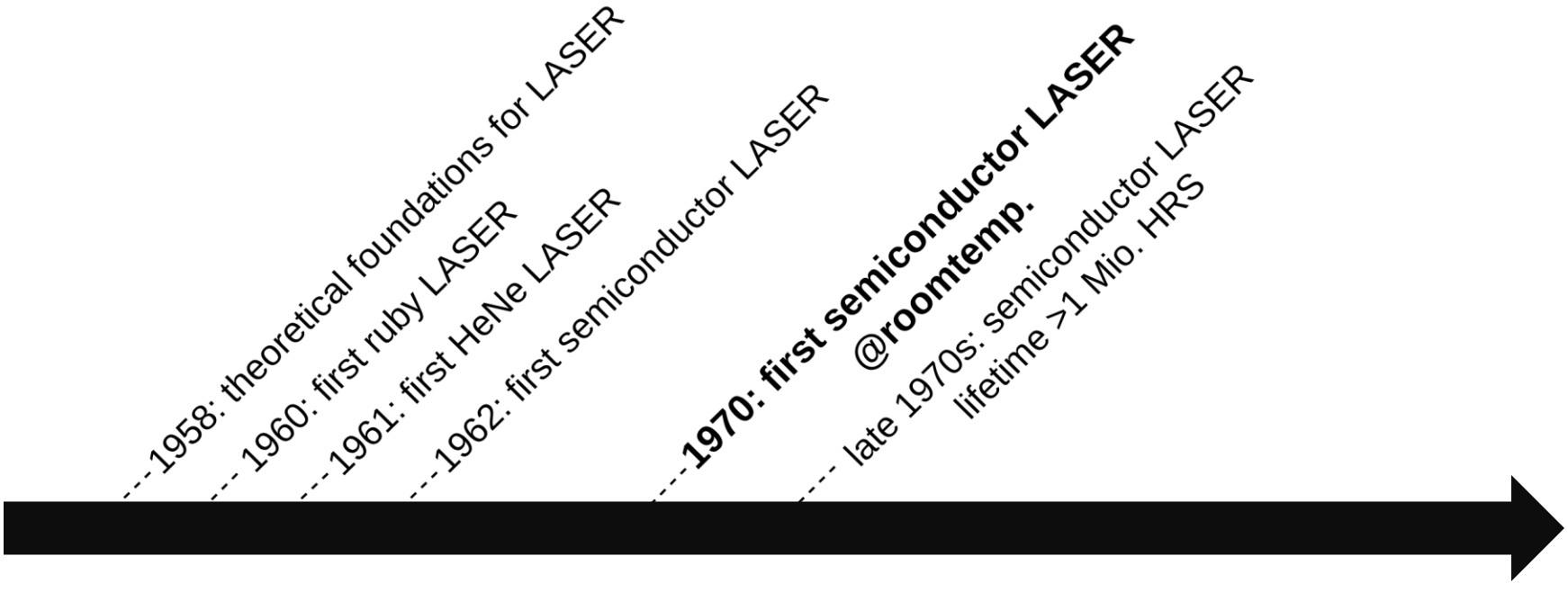


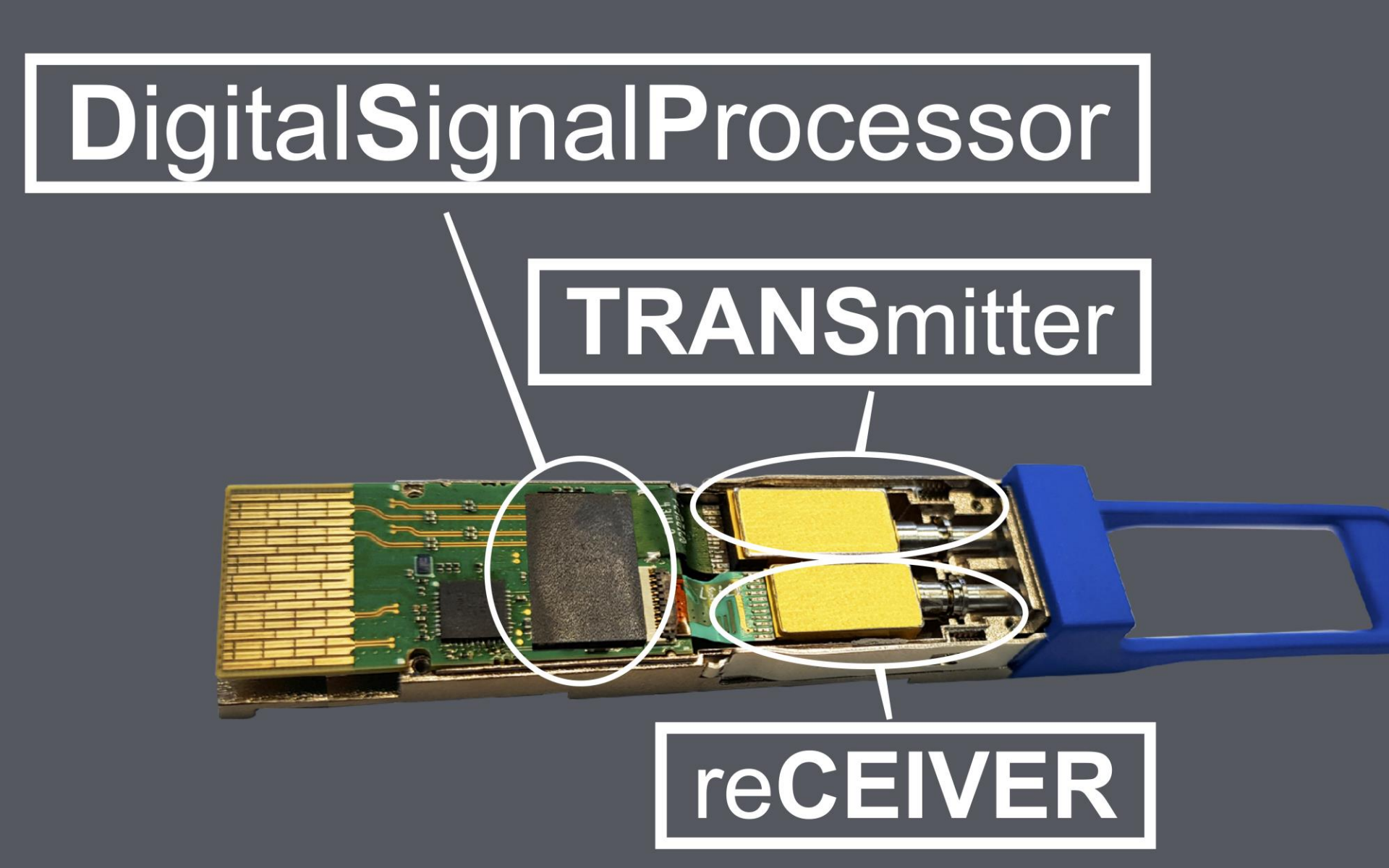
Source / Laser

Bulky
Powerhungry
Troublesome to operate

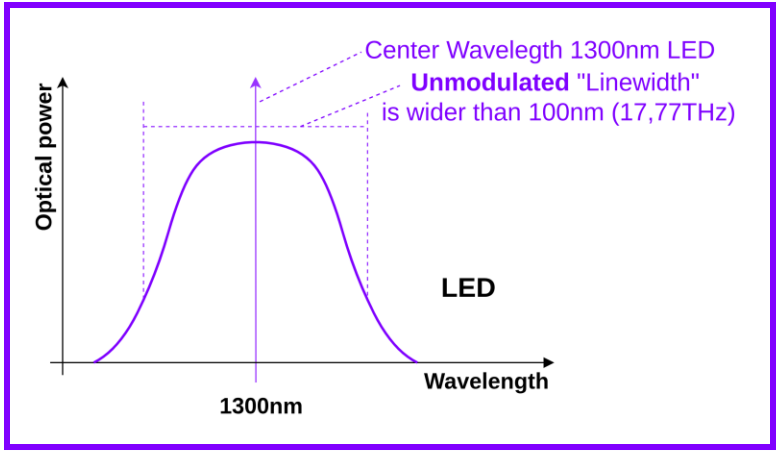
Past → **Present**

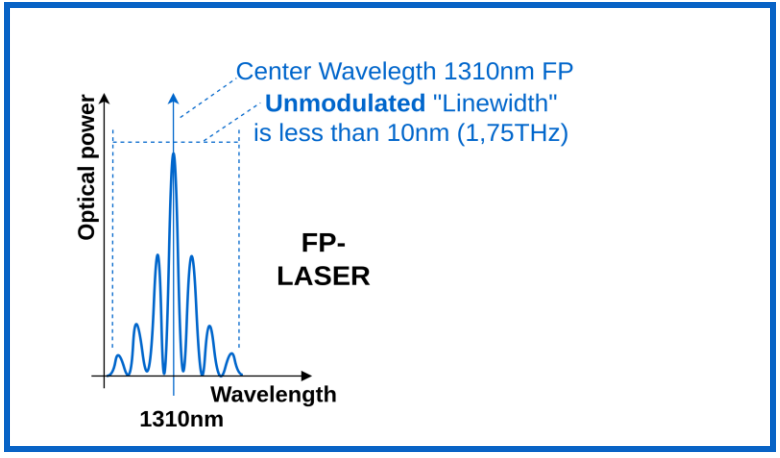
Small
Efficient
Reliable

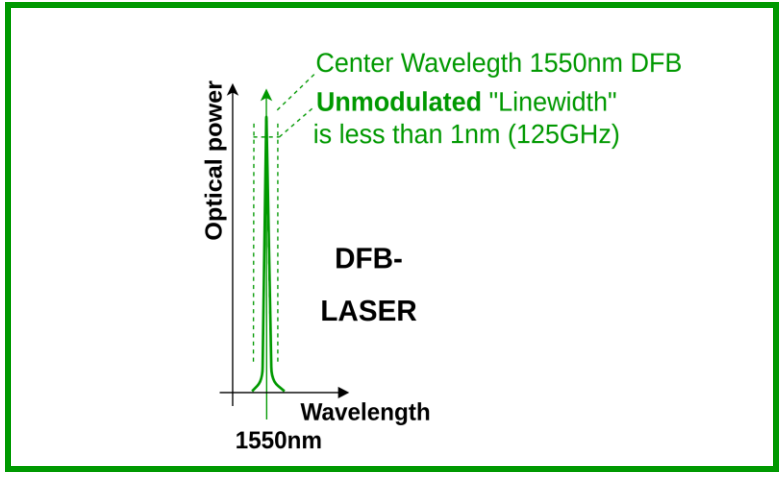


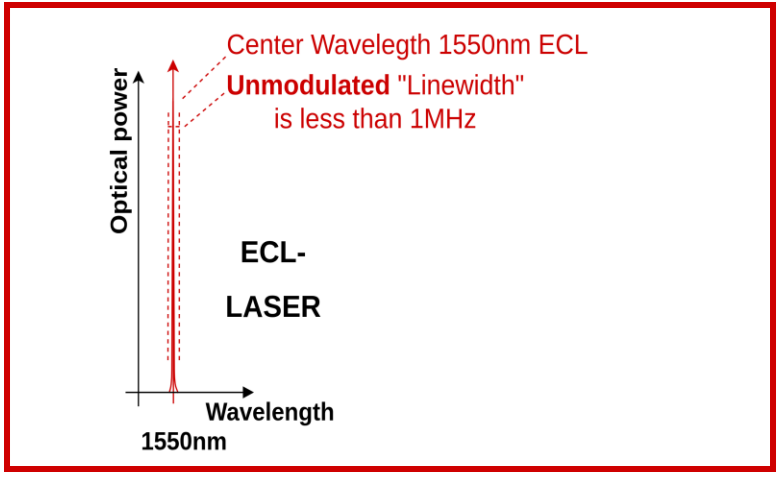

DigitalSignalProcessor
TRANSmitter
reCEIVER

Source Spectrum

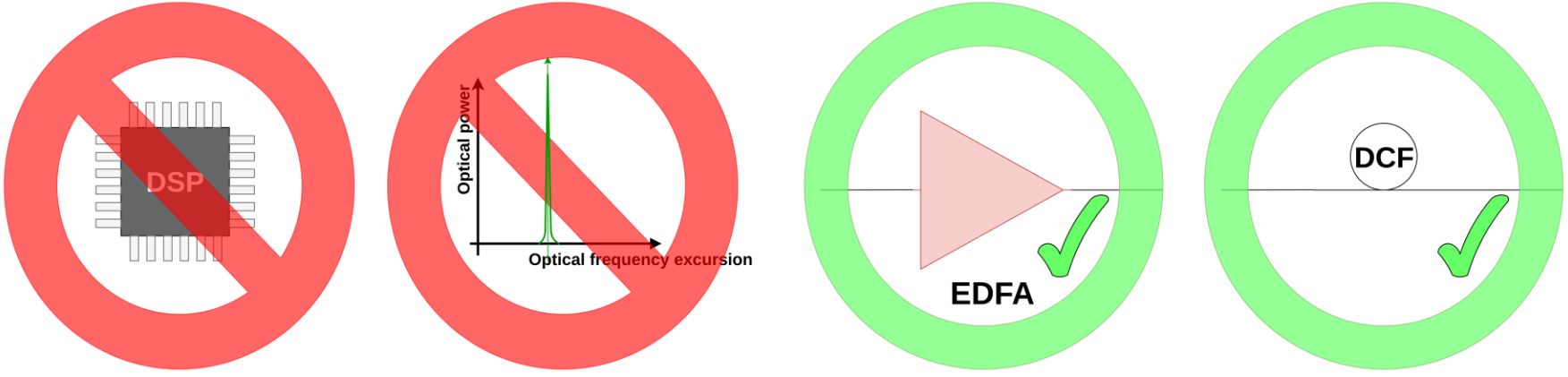


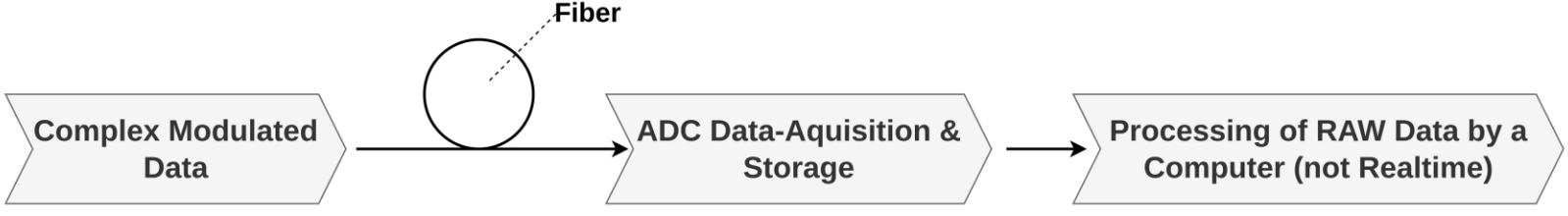




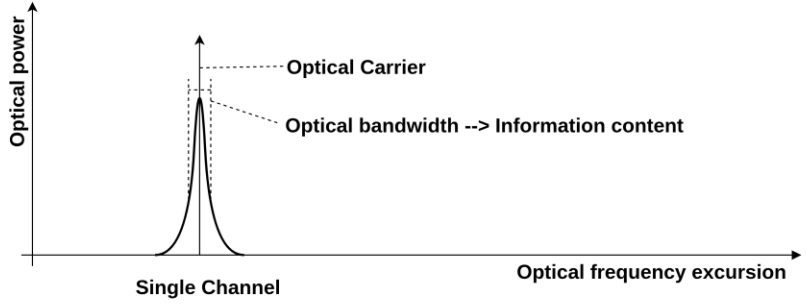


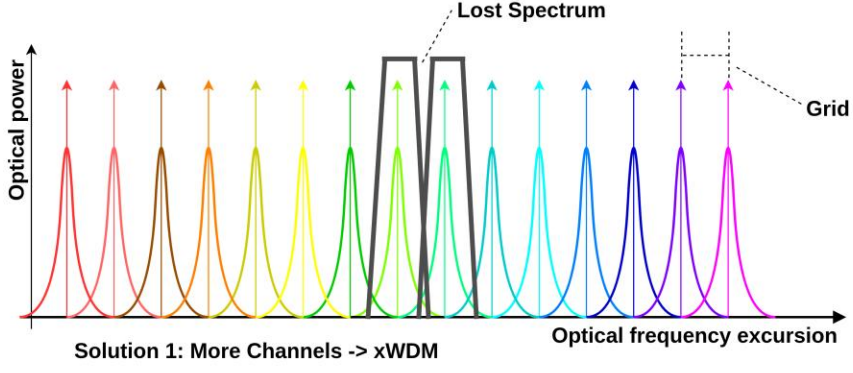
Why early Coherent was not pursued

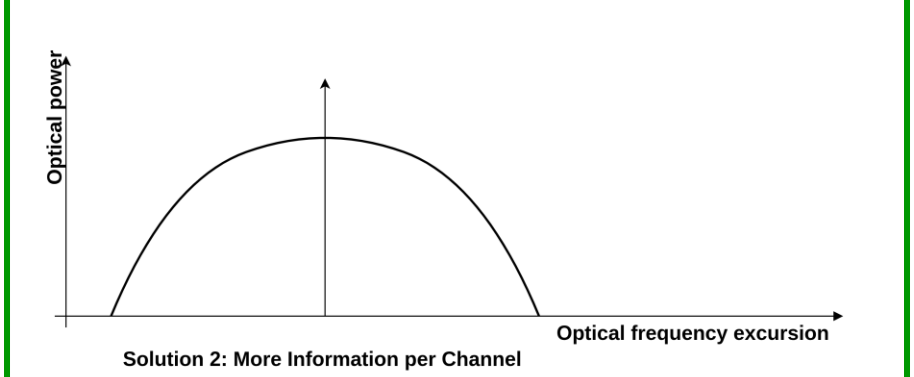




Increasing traffic per fiber



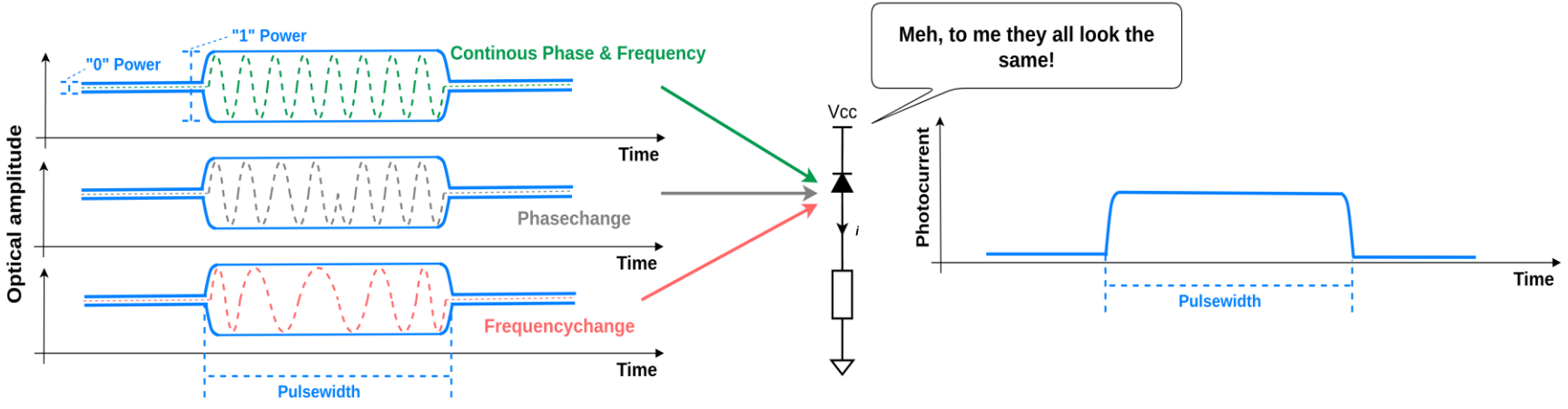




this was the easy part 1/3

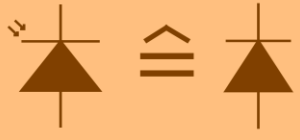
now back to complex numbers ->

Limitations of On-Off-Keying with Direct Detection

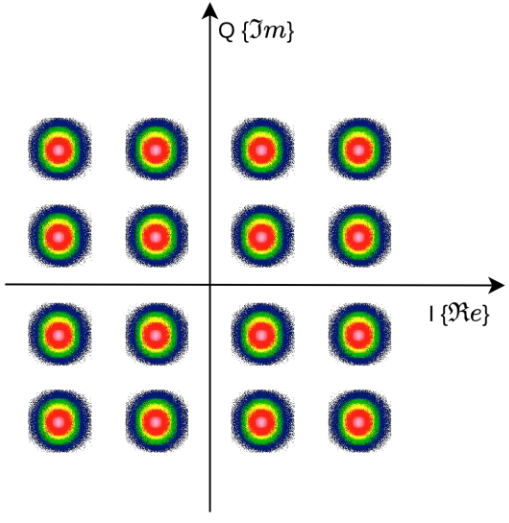


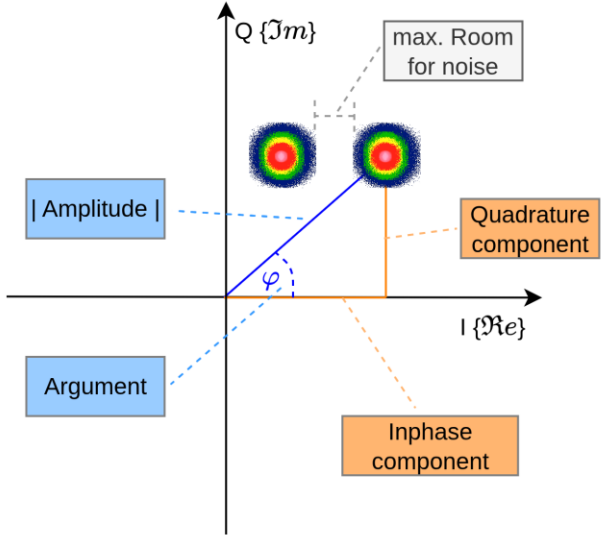
Polarization?

to be precise



Higher order modulation constellations



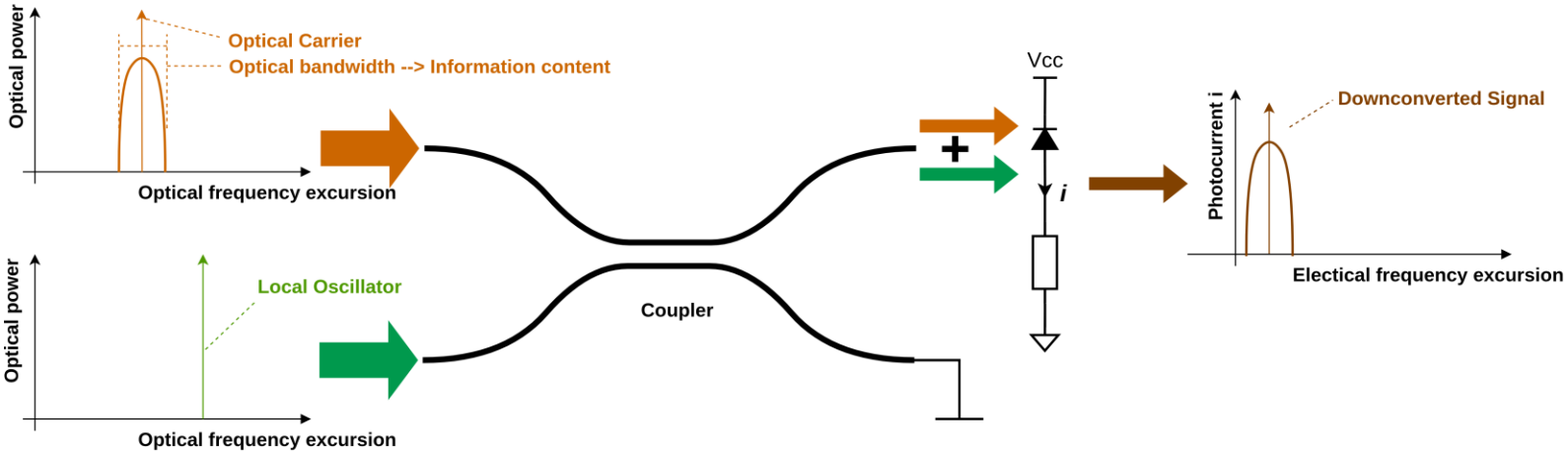


- 16 constellations equal 4 Bits
- Two of those patterns are sent on orthogonal polarizations
- 425Gbps @ 53.125GBd/s

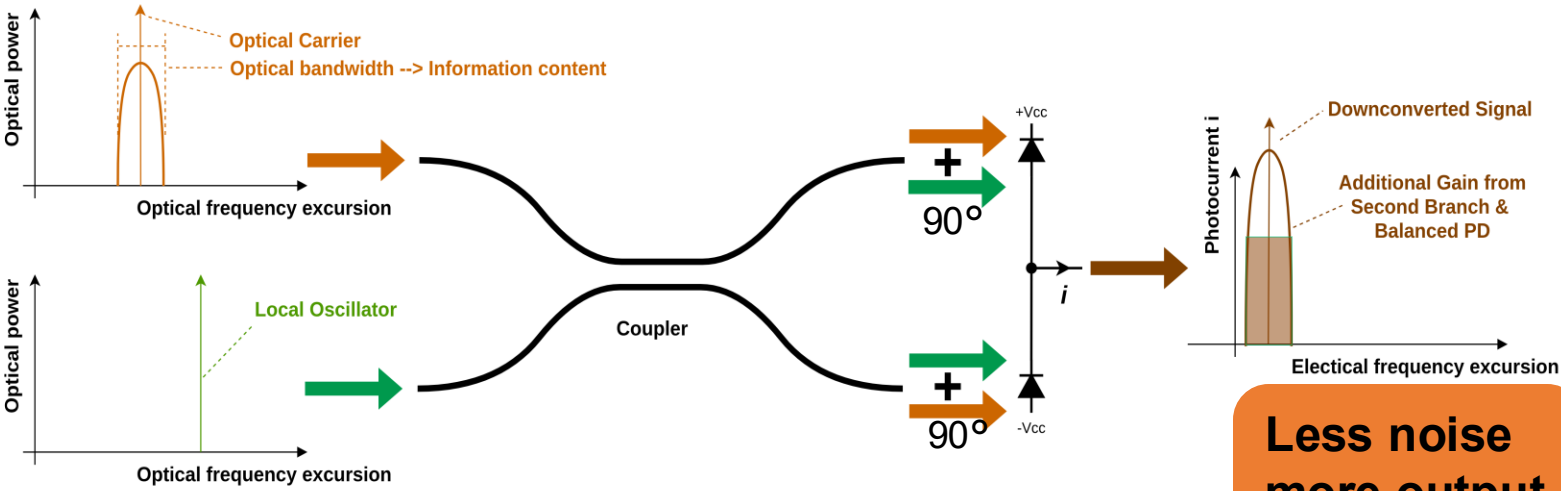
- Constellation can be expressed by either Amplitude and Argument or by the I & Q -components
- Less Room for noise, compared to OOK

Receiver

Single-Ended

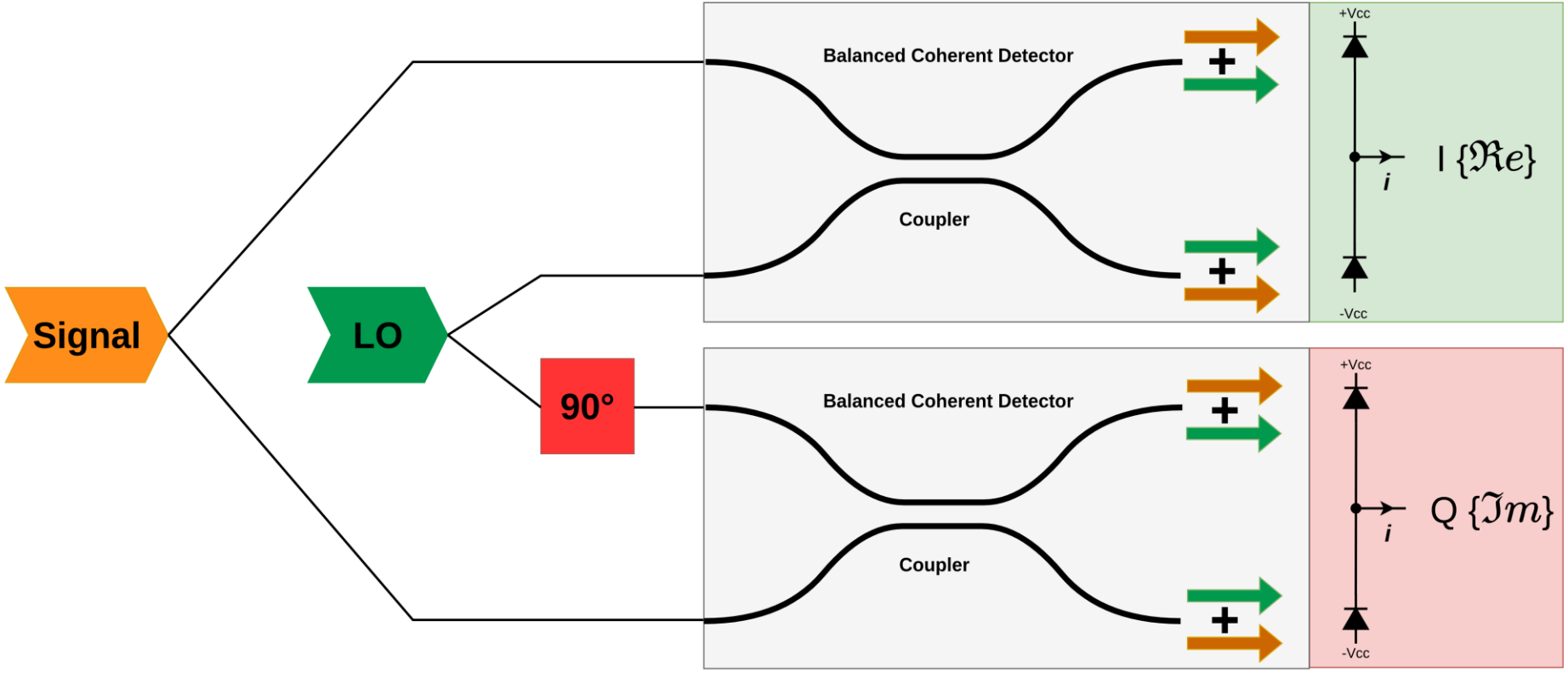


Balanced

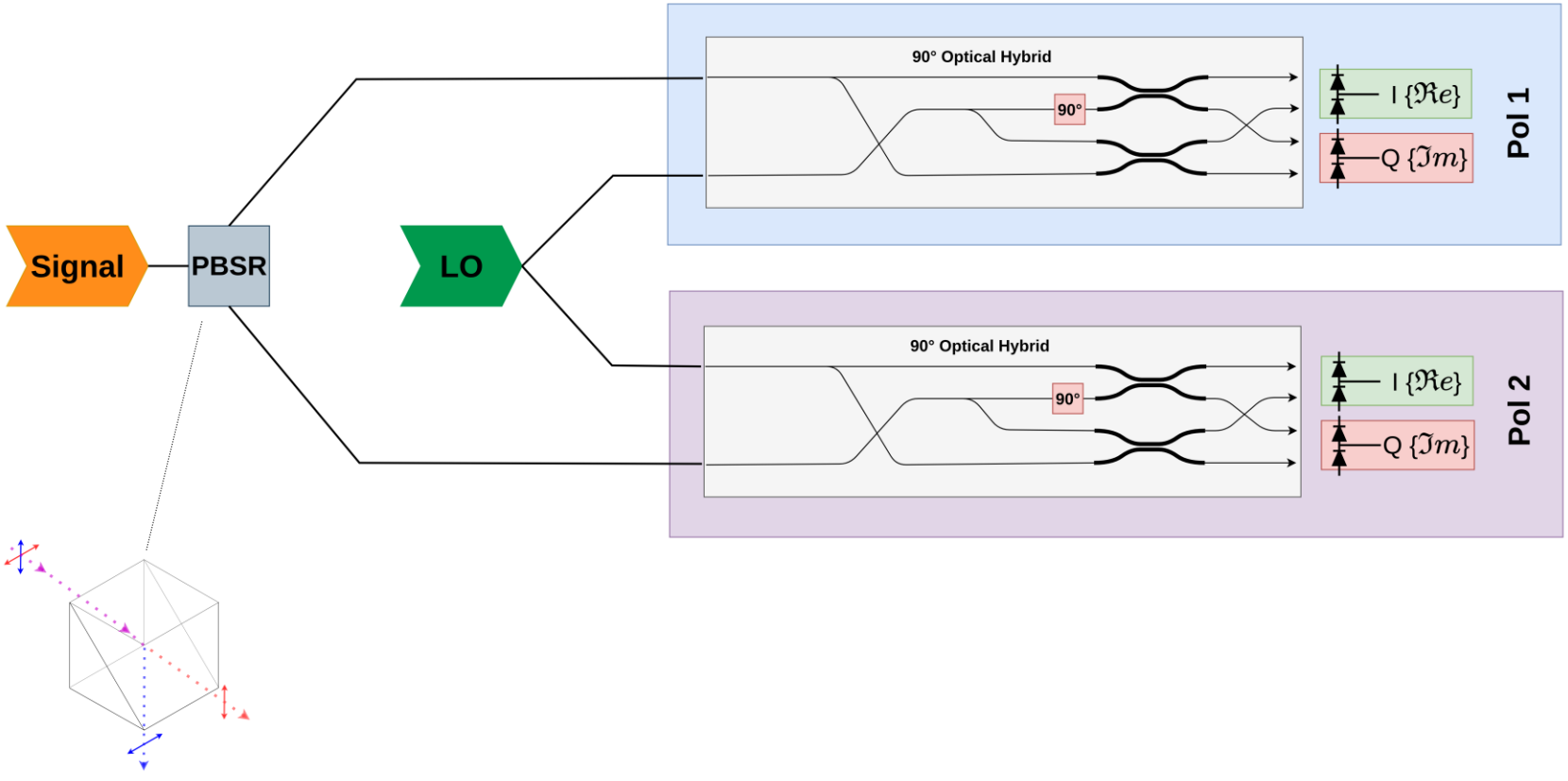


Less noise more output

Phase-Diversity



Phase-&-Polarization-Diversity



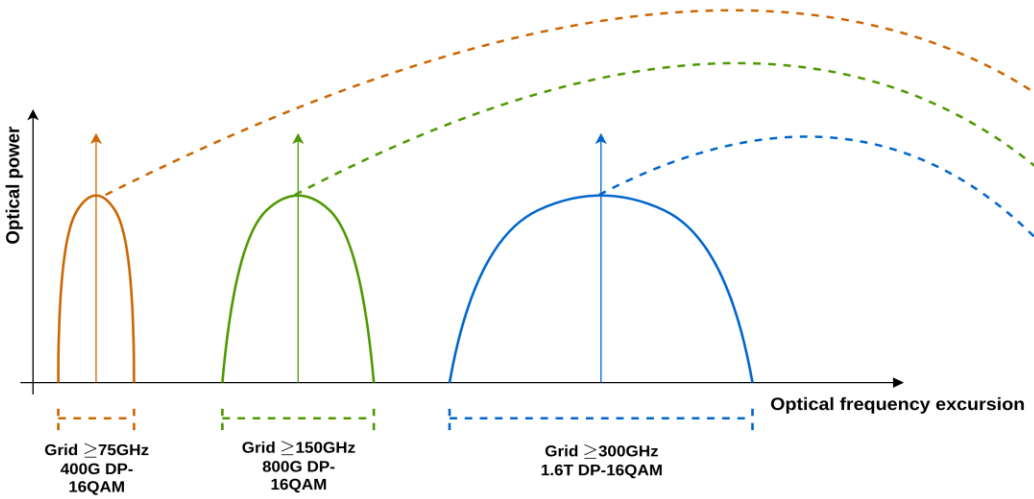


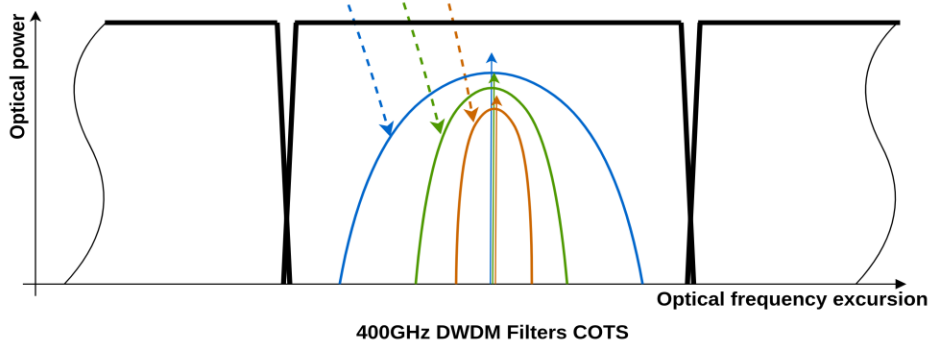
DENOG17

10.11.2025
Haus der
Technik
Essen
Germany

half way through

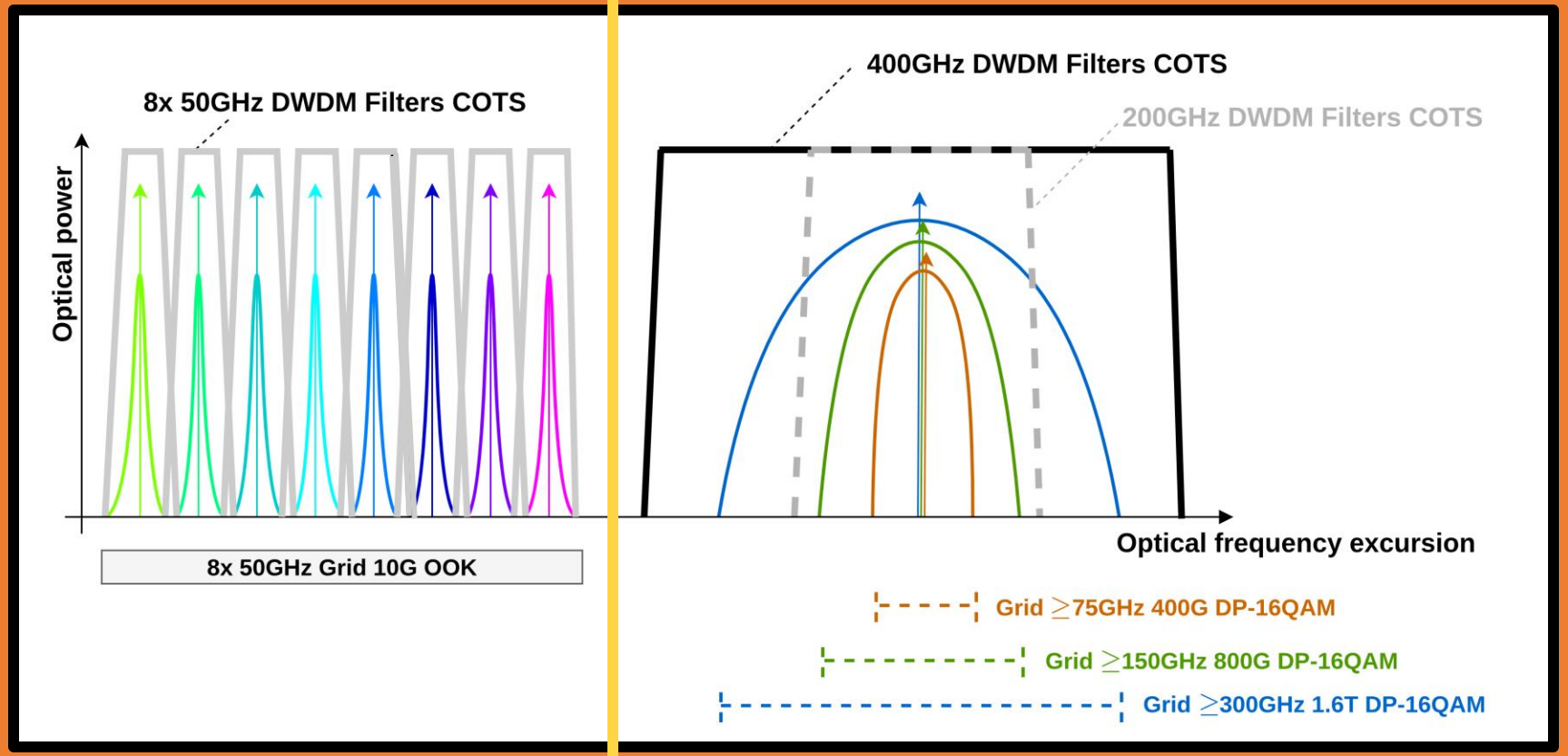
Coherent Detection Bandwidth





96 x 50GHz channels in C-Band

12 x 400GHz channels in C-Band

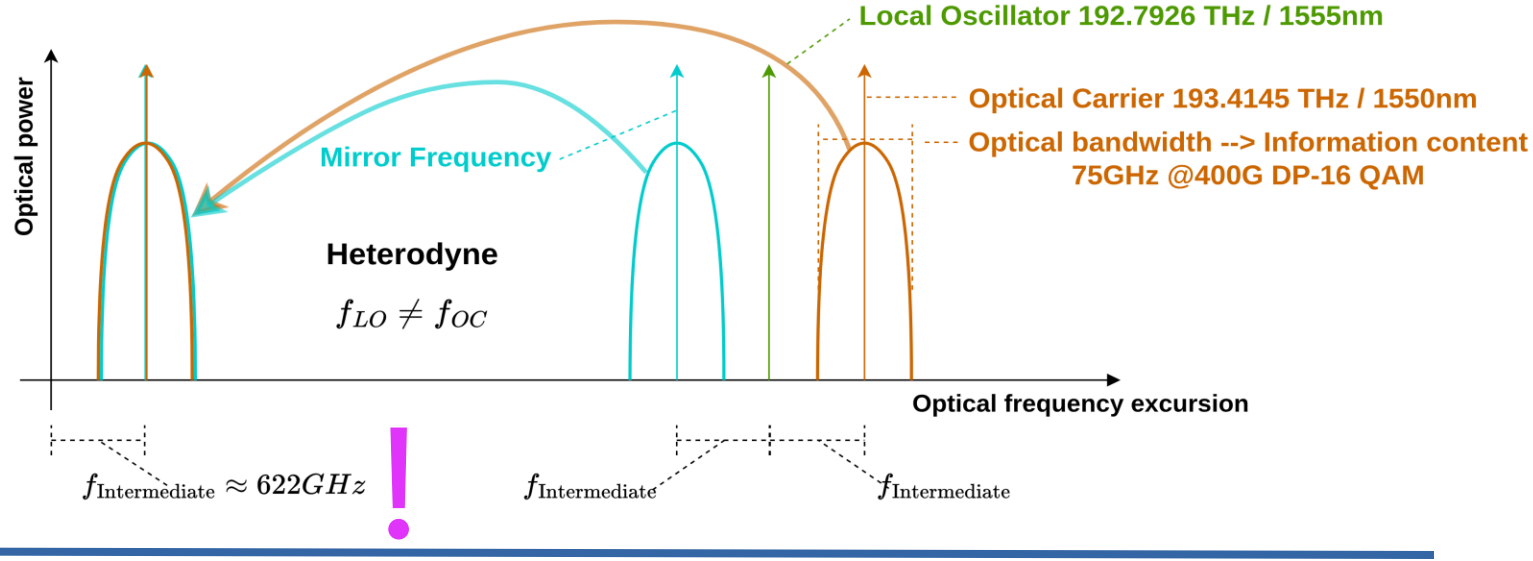


IL ~ 2dB

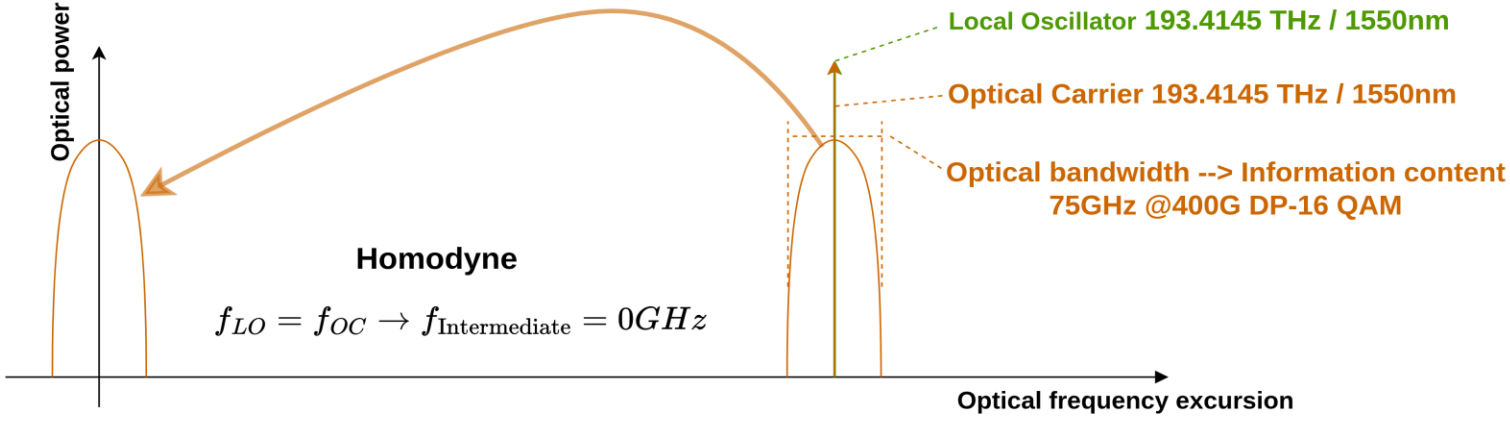
COTS = Commercial-Off-The-Shelf

downconverted signal

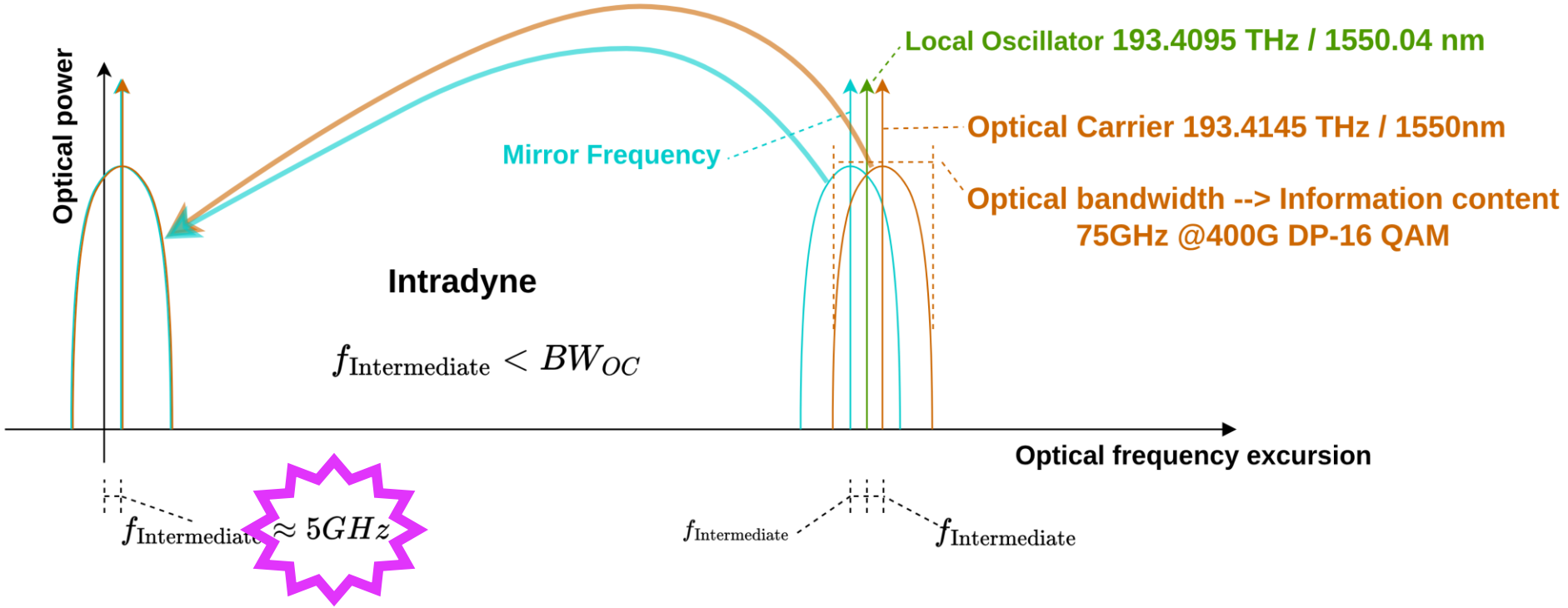
Heterodyne



Homodyne



Intradyne Detection




```
# :-)
```

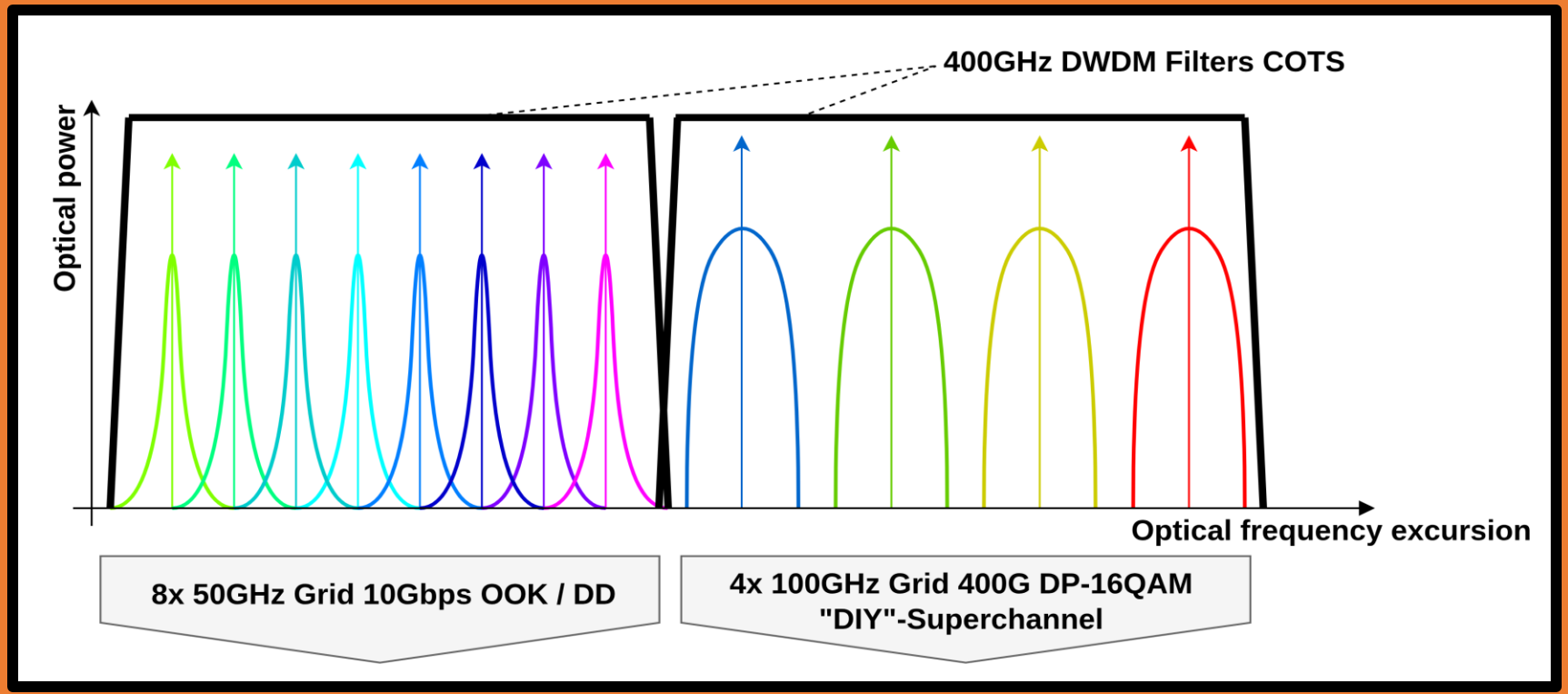
we made it

to the moon



Source: https://de.wikipedia.org/wiki/Rakete#/media/Datei:Apollo_8_Liftoff.jpg, November 2025

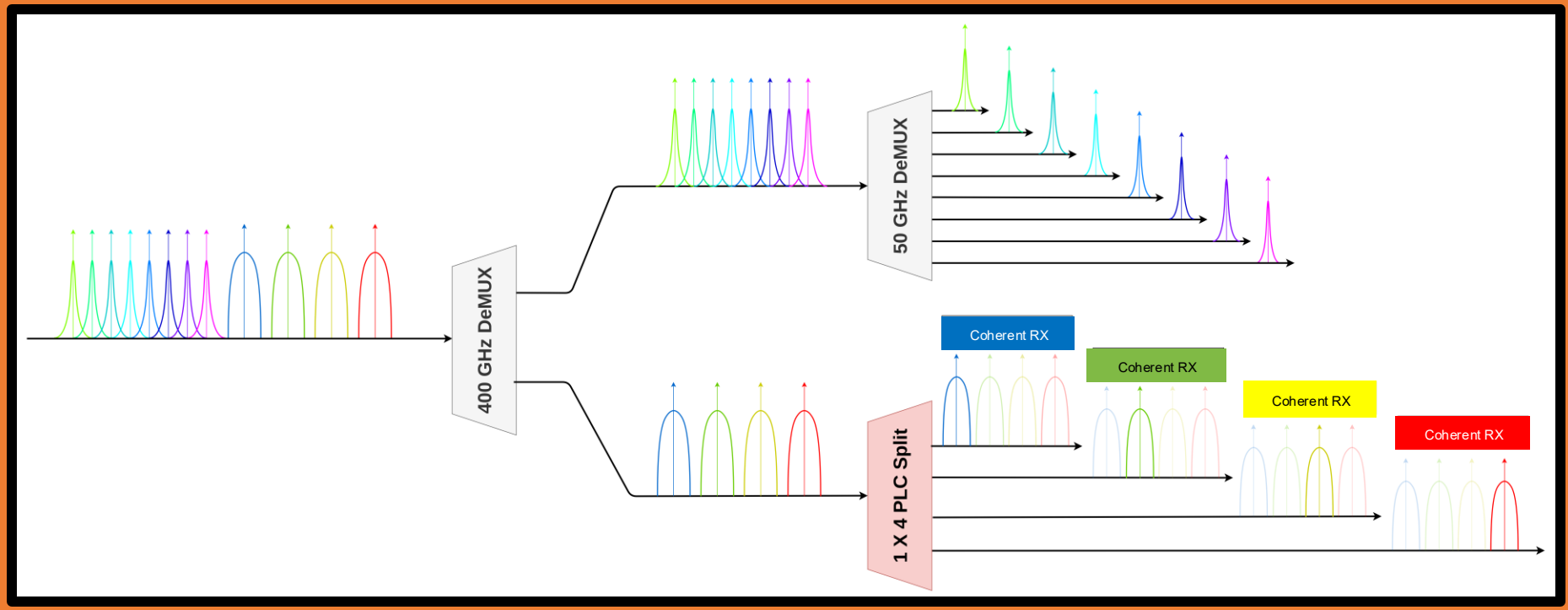
Coherent Detection DIY-Superchannels



Run the subband through regular 50GHz DWDM MUX / DeMUX

Use cheap PLC 1x4 / 4x1 splitters to combine TX and split RX

Flexible Network Architecture



hint: make a frequency plan for your spans

our way to the universe

Coherent Detection is robust and awesome

Foundation for Colorless are Balanced-receiver

400GHz MUXes will make your network flexible

800G Coherent ZR+ OSFP is available

Think in **THz** and **GHz**
NOT in nm or channelnumbers any longer



MY CONCLUSION

I can't wait for the next social today!

Authors:

Thomas.Weible@flexoptix.net

Gert.Matyasowicz@flexoptix.net



graphics and illustrations made by the people of FLEXOPTIX, November 2025 – when sharing citation of source required