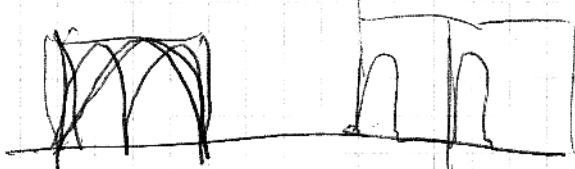


Bit slot

$$10 \text{ Gbit/s} \rightarrow 10 \text{ GHz}$$

$$\rightarrow 10 \cdot 10^9 \frac{1}{s}$$

$$\rightarrow \frac{1}{10 \cdot 10^9} \text{ s} = \underline{\underline{0,1 \text{ ns}}}$$



Exercise B:

- B Log Q - Factor: 40 dB

Ex C:

Data-Rate-Half

→ set: N-division factor: 2

Bei pure Cover

3dB Verzerrung
Offset @ von ~~2,5~~ auf 0 → RZ 33%

gain verdoppelt ~~2,5~~ auf 5 → ~~2,5~~ auf 5 → 66%

~~delay 10ns~~ ~~10,25ns~~ ~~10ns~~ ~~5ns~~

Pulse Cover

- Offset Voltage: set to 0 V → 33%
- gain (lin) from 2,5 to 5
- delay SqrwktT : T delay to 0,75/0,01 (ps)
→ broke 0,03 ns

Project 2:

A : NRZ - Q-Factor 40dB

RZ : Q Factor 100dB

→ RZ-Signal sieht besser aus!

- Quantum efficiency RZ-Polarisator
- ~~NRZ~~ $qe: 0.1 \rightarrow NRZ: 0.0005$
Q-Factor = 40dB

$qe: 1 \rightarrow$ max. blest pos

NRZ: $qe: 0.1 \rightarrow$ amplitude $\rightarrow 6e-5$

\rightarrow weniger Rauschen
mehr Rauschen!

$q_{eff} 1 \rightarrow$

"Weg, Rauschen"

single Pole Filtering (aus) $q_{eff} = 0.7$

NRZ: \rightarrow really noisy

MRZ Ref. Wavelength $\rightarrow 800\text{nm}$

\rightarrow no real charge left ~~leftover~~!

MRZ Dark-Current $10\text{nA} \rightarrow$ no real charge-

\rightarrow

NRZ

Signalfrequenz f_{geO17} \ no real changes

geO11

NRZ: -3dB Bandwidth = 406 Hz

\Rightarrow doppelt so schnelle Rate

NRZ -3dB Bandwidth 1064 Hz

halb so schnell!

RZ -3dB 40 und 20 kHz

Bandwidth viel besser trennen bei 20 kHz
40 nicht trennbar.

Project 3

- Dispersion @ Ref. freq. $\approx \infty$
- Dispersion Derivative @ ref. Freq. ≈ 0
- Zero disp. Wavelength: 1413 nm

Ex 4.

before Fiber:

~~fiber~~ fiber new 0.036 ns

~~0.33~~ 0.032 ns

10 km

length	0km	10km	20	30	40
t / ns	0.033 0.034	0.036 0.038	0.046	0.062	0.079
Amplitude / mW	4.03 4.01	1 5.098	2.60	1.24	0.638
PWR	8.75	0	-1.186	-3.159	-5.147
ExB: dBm	1.720	0	-	-	-

Spec Power after Fiber:

~~-3.159~~ -3.304 dBm

\rightarrow ~~set~~ 1550nm laser

\rightarrow set CW-Power to 3.304 dBm

\rightarrow Power after Fiber: 0 dBm

Θ	10km	20km	30km	40km
Q/abs	40dB	39,99	34,40	29,65

How much ϕ

20dB Jitter: 0,000997593 ns

$$\underline{0,99} = \underline{1 \text{ ps}}$$

Bit Slot 0,1ns = 100ps \rightarrow 1% jitter

the loss value of the fiber is

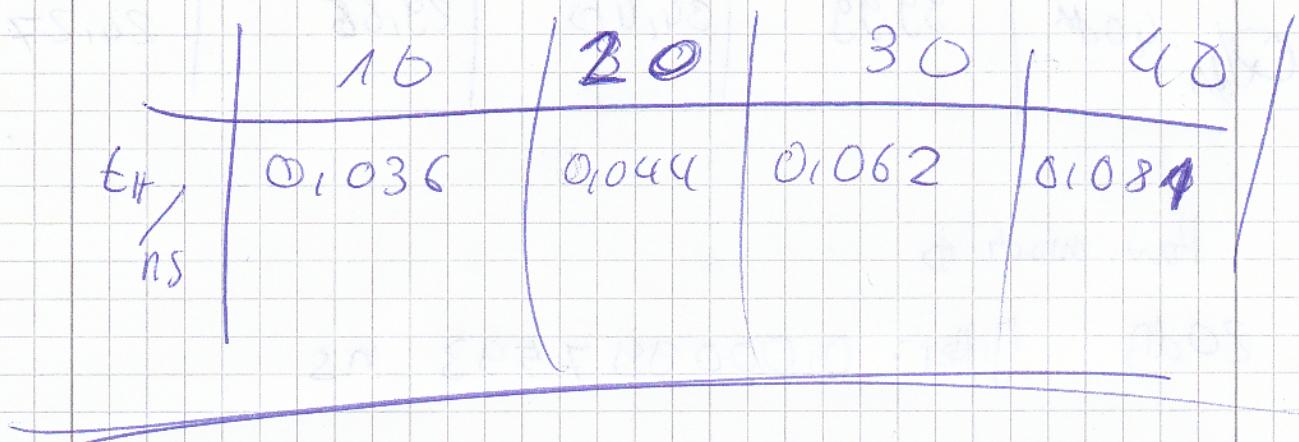
$$\underline{\underline{0,123538}}$$

Comparison plot: Quber FWHM

Exercise C:

ΔFWHM [ps/nm]	0	25	50	75	100
$\Delta\text{F}\Delta\lambda$ [nm]	40	33,8	31,7	30,2	29,9

66



- ~~third order~~

- Loss: additional derivative

- broadening: Dispersion derivative at ref. frequency,

$$\begin{aligned} & \cancel{0.084 \text{ ps}} \\ & \cancel{\text{nm}^{-1} \text{ cm}} \end{aligned}$$

$$25 \text{ MHz} \quad 25 \cdot 10^6 \frac{1}{\text{s}}$$

$$\lambda = \frac{c}{f} = \frac{3 \cdot 10^8}{25 \cdot 10^6} \text{ m}^2$$

~~0.035 ns~~

0.035 ns