Dispersion penalty for single-mode serial PMD

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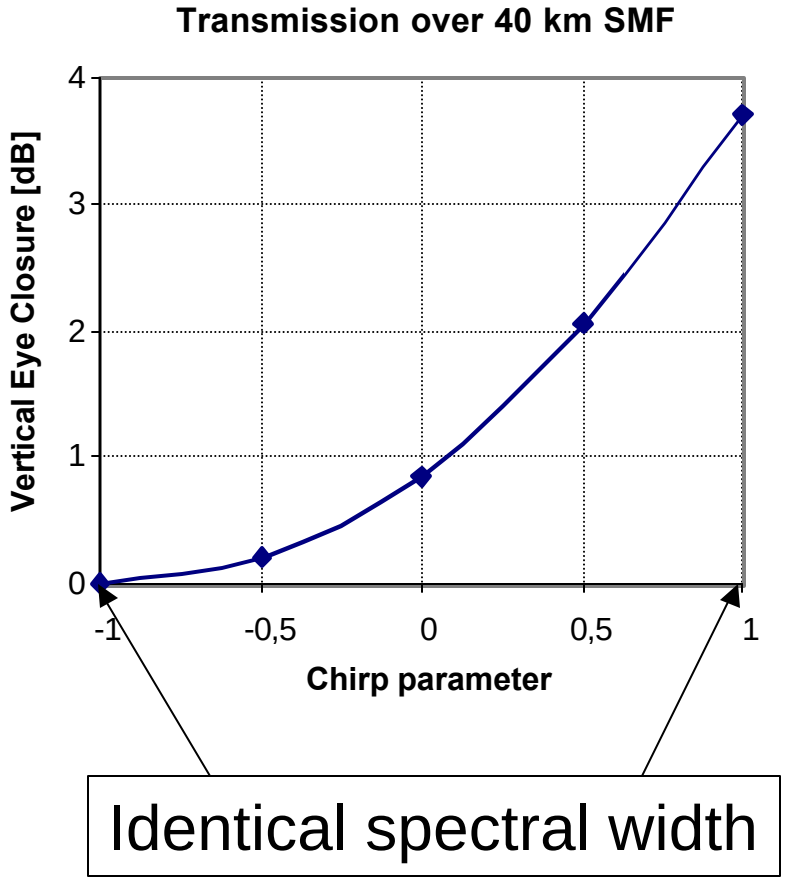
SMF Transmission

- Different from multi-mode transmission
  - Dispersion [ps/nm/km] is the important figure
- RMS spectral width is not critical here
- The transmitter chirp is important
  - laser wavelength changes with modulation
  - degrades the eye diagram
- Low dispersion at 1310 nm:
  - 1310 nm over 10 km is probably fine anyway
  - 1550 nm over 40 km is NOT

Simulation results: DFB-EA @ 1550 nm after 40 km SMF



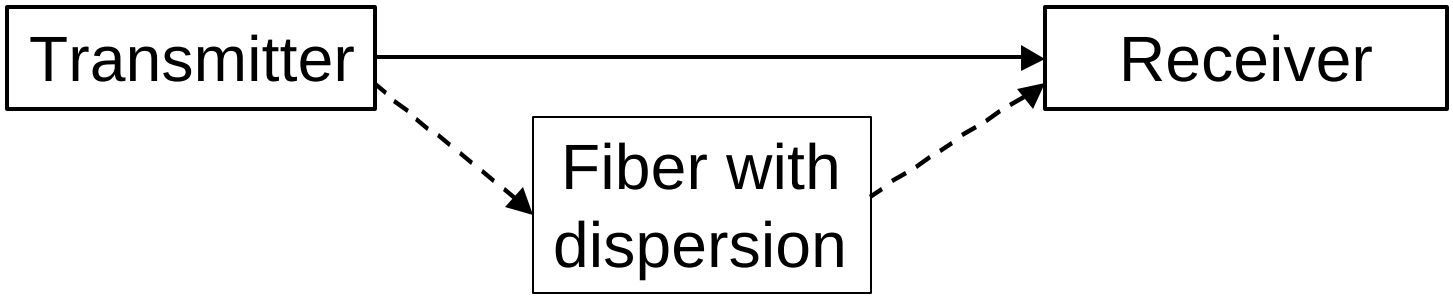
- Results from a simulation program in MatLab
- If there is interest, the program can be made public

This does not show up in any measurement standardized so far

Possible measurements

- Spectral width:
  - Does not give sufficient information
- Direct chirp measurement:
  - different types of chirp and complex measurement
- Dispersion penalty
  - this is what really matters
  - fairly simple

Dispersion penalty measurement



- Measure sensitivity with & without fiber
- We need to either
  - find a good standard to reference (EIA/TIA 526-10 ?)
  - or define the measurement ourselves

Changes to current draft

- Introduce a dispersion penalty in the current draft
  - 2 or 3 dB is a reasonable figure at this point, but needs further consideration
- We need to make sure that receiver measurements are relevant to single-mode transmission
  - We may need a different stressed eye

In summary

- We need to have control over chirp
- Chirp can be measured, but
  - It is not straightforward
  - It is not really what we want to control
- Dispersion penalty is the critical figure
  - It can be measured directly
- We need this at 1550 nm
- We might need this at 1310 nm