# Chromatic dispersion compensation with negative dispersion fiber
For SuperPON application

Dispersion management using dispersion compensating fiber with negative CD

- DSCM = dispersion & slope compensating module

- DSCMs can be delivered in a very small form factor; e.g. on line cards.

- Standard DSCMs feature:
  - Very good dispersion compensation over a wide wavelength range
  - Modulation format and speed independent dispersion compensation,
  - No channelization effects or penalties
  - Low insertion loss
  - Low PMD
  - No power consumption

- Custom specific DSCMs based on dispersion compensating optical fibers offers possibility of matching dispersion with very fine granularity

- Large volume fiber manufacturing and production automation allow for a solution with low relative cost factors.

- Mature product, (500,000 units in the field)

- Short lead time

Standard DSCM

- C-band operation

- Compensating G.652 or G.655 fiber

- Ordering guides available

- Standard configurations include:
  - Selection of fiber length to be compensated
    - G.652 up to 150 km, G.655 up to 300 km
  - Connector option
    - All typical connector types
  - Mechanical options
    - Spool, DSCM box or Rack mount
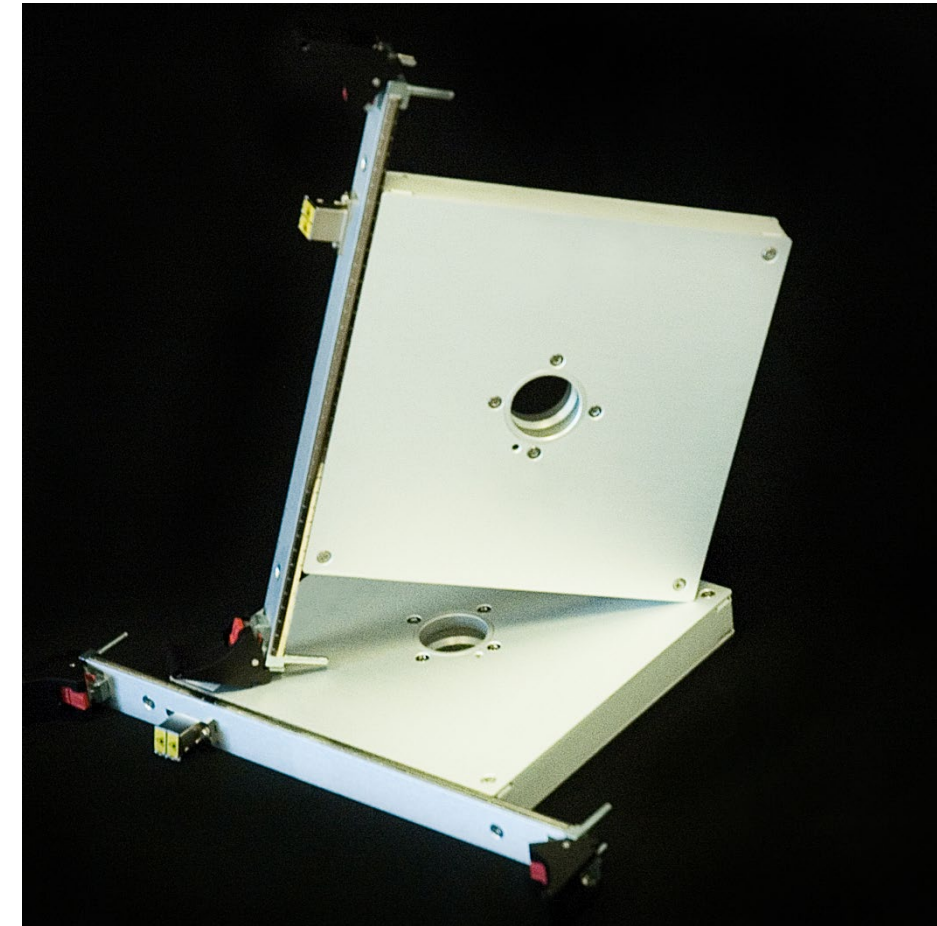
Dispersion compensation of SMF G.652 – Small Form Factor

| Fiber Parameters	Low Loss MicroDK
Parameter @ 1550 nm	
Fiber Dimensions (µm)	90/145
Fiber Dispersion (ps/nm/km)	-170
Fiber Loss (dB/km)	0.56
FOM (ps/nm/dB)	300
Relative Dispersion Slope (1/nm)	0.0028-0.0042
Coiling Diameter (mm)	50
Splice Loss per End (dB)	0.3
Typical IL for 100 km G.652 Compensation (dB)	6.3
Effective Area (µm^2)	16

DSCM for Compensation of G.652 (e.g. OFS AllWave, Corning SMF-28, etc.) C-band 1528–1565 nm

Module Parameters	DSCM – 50
Parameter @ 1550 nm	
Dispersion (ps/nm)	--853
Insertion loss (dB)	3,4
PMD (ps)	0,22
Delay (µs)	25,0
FIT rate (failures per billion device hours)	5
Spool Dimensions (Diameter * height)	110 mm * 23 mm

Residual dispersion
Compensating 50 km of SMF G.652
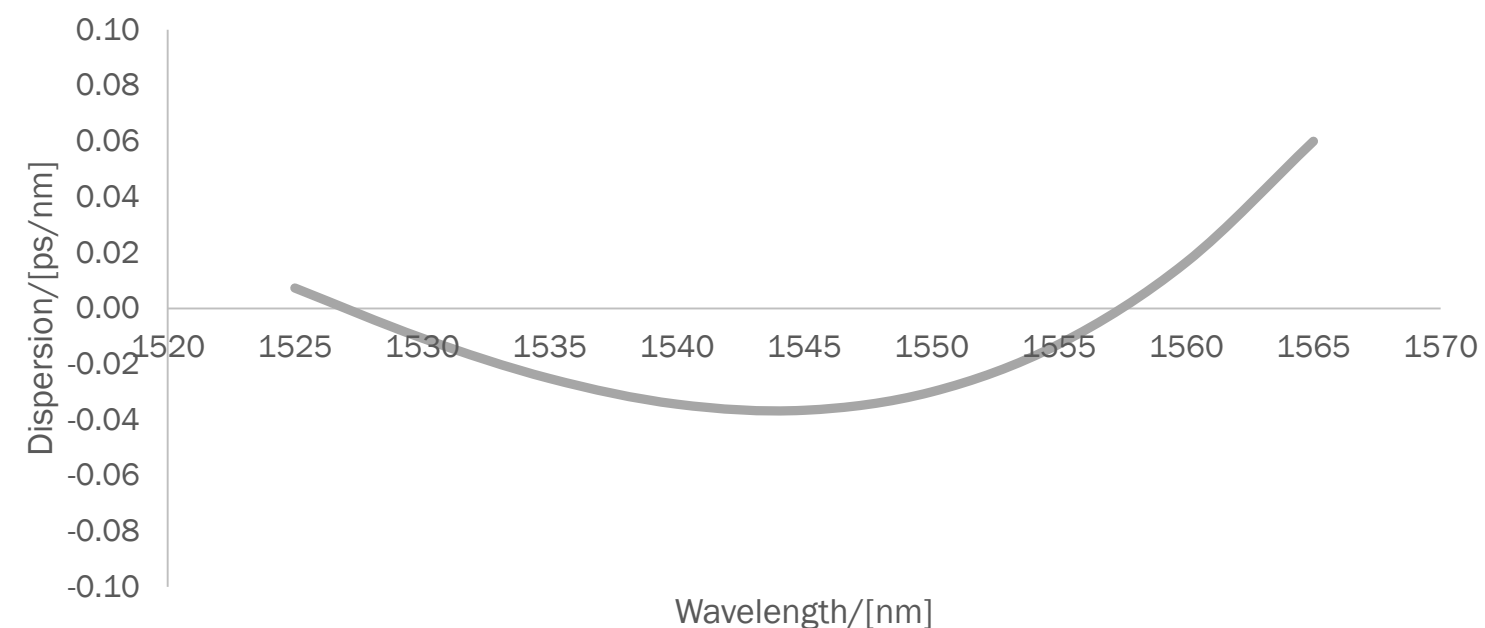
Recommendations

- EPON protocol is tolerant of asymmetric delays. It only needs to measure the total round-trip time.
  - Should check if asymmetry impacts 1588 timing?

- Suggest writing SuperPON specs which allow multiple dispersion compensation technologies to be used in commercial implementations.

THANK YOU

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