

# **IEEE802.3aq Channel model ad-hoc Task2: Time-varying study and modal noise**

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# 1. Temperature variation impact

- Transmitter temperature, fiber temperature and receiver temperature can be assumed not correlated.
- Receiver temperature change has minimal impact on received signal, will affect receiver operation and not the received signal.
- Fiber temperature range 20°C, centred at 25°C, will result in fiber length change. The expected speed of change is less than 20°C/hour.
  - $\alpha_{\text{silica}}=3.4 \times 10^{-7}/^{\circ}\text{C}$  (total expected change  $6.8 \times 10^{-6}$ ), will change the modal delays (they scale with the length) by 5 ppm.
  - $\alpha_{\text{plastic}}=10^{-4}/^{\circ}\text{C}$  (total expected change  $2 \times 10^{-3}$ )
- Connector temperature change may result in small offset change ( $<1\mu$ ).
  - small attenuation change
  - polarisation change depending on the type of laser and launch (kropp\_1\_0704.pdf and sun\_1\_0704.pdf)

## 2. Temperature variation impact on laser

- **Laser temperature change will result in laser wavelength change**
  - the operating temperature range 0°C to 80°C,
  - the amount of change will depend on the type of laser,
  - modal delays values will change
- **Laser temperature change will result in and modal field change**
  - power-coupling coefficients will change
  - polarisation change depending on the type of laser and launch  
(sun\_1\_0704.pdf)