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Fiber signal attenuation due to temperature

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The SLAC National Accelerator Laboratory distributes its timing signal throughout the beam via a mix of fiber cables. It is known the RF over fiber signal is affected by temperature fluctuations causing a phase shift in the signal. That is why special consideration was taken in the design for the type of fiber and type of connector to be used for the LINAC Locking system. As the communication of the system would be a RF over fiber signal. However, there have been some instances over the years where higher temperatures have caused issues with the continuous signals going through the fibers. The cause of the degradation of the signal would usually be a damaged fiber or degraded transceiver but increased temperatures would lead to a high enough signal loss before complete failure of the devices happened. This paper describes how SLAC takes into consideration temperature environment for troubleshooting efforts and possible design considerations to make for future developments.

Footnotes

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