

Progress on a cascaded optical link between Paris and Strasbourg

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In the frame of the REFIMEVE+ project, aiming at disseminating an optical frequency standard to more than 20 laboratories in France, we present the progress made towards a metrological fibre wide-area network.

We are currently developing a cascaded link between Paris and Strasbourg using the fibers of the French National Research and Education Network, RENATER. Following the so-called dark-channel approach, the ultrastable signal is copropagating with data traffic using wavelength division multiplexing. Due to significant reflections and losses along the link, which cannot be compensated with amplifiers, we have developed some repeater stations for the metrological signal¹. These stations give the possibility to amplify and filter the ultrastable signal and compensate the propagation noise. The remote operation of these stations is a key element for the deployment of a reliable and large scale metrological network. We implement some key measuring points in order to set-up and optimize the operation and detect and tag the possible dysfunctions of the link.

We will report on the first implementation of this remote repeater station on a 540-km cascaded link between Paris, Reims and back. Extension to Nancy and Strasbourg (Fig. 1) will also be discussed.

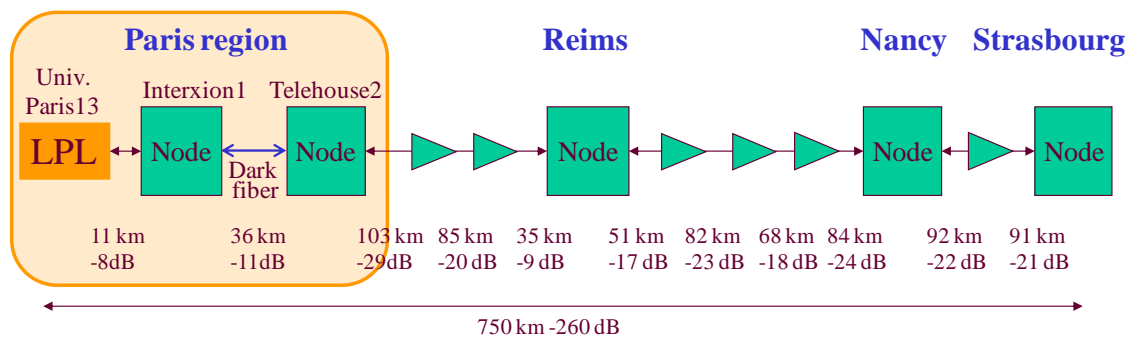


Fig. 1: Scheme of the fiber link between Paris and Strasbourg, which is composed of a pair of fibers equipped with multiplexers and bidirectional amplifiers.

¹ Lopez O., Haboucha A., Chanteau B., Chardonnet C., Amy-Klein A., Santarelli G., "Ultra-stable long distance optical frequency distribution using the Internet fiber network," *Optics Express* **20**, p 23518-23526, 2012.