

# Establishing a metrology network to disseminate high accuracy optical frequencies through the Swiss academic fibre network

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Frequency dissemination in phase-stabilized optical fiber networks for metrological frequency comparisons and precision measurements are promising candidates to overcome the limitations imposed by satellite techniques. However, network constraints restrict the availability of dedicated frequency channels in the commonly-used telecommunication C-band. Here, we demonstrate the dissemination of an SI-traceable ultrastable optical frequency in the L-band over a 456 km fiber network. We characterize the optical phase noise and evaluate a link instability of  $4.7 \times 10^{-16}$  at 1 s and  $3.8 \times 10^{-19}$  at 2000 s integration time, and a link accuracy of  $2 \times 10^{-18}$ . We demonstrate the application of the disseminated frequency by establishing the SI-traceability of a laser in a remote laboratory. This architecture has the potential to be scaled up to provide superior frequency references for precision laboratories in Switzerland.