REGENERATION STATION FOR
ULTRA-STABLE OPTICAL FREQUENCY TRANSFER

Fully automated laser repeater station for
long-distance optical frequency transfer using optical fibers

This unique industry-grade regeneration laser station has been developed in collaboration with LPL (Univ. Paris 13) and LNE-SYRTE (Observatoire de Paris) laboratories, in the frame of the REFIMEVE+ project

General architecture

The regeneration of the reference optical signal is achieved thanks to the heterodyne optical phase-locking of an integrated ultra low-noise laser diode on the reference signal. The regeneration station also actively compensates for the phase noise accumulated due to the propagation along the fiber. As a result, it is an equipment of choice for state-of-the-art optical clock remote comparisons.

Main features (see also specifications below)

- Frequency stability at the level of 10^{-20}
- Compatible with DWDM telecom networks (dark channel and dark fiber)
- Fully Automated Phase-Lock Loops
- Integrated polarization controller
- Software remote control of all physical parameters

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Performances

Frequency noise floor (short term)	4.10^{-17} @ 1s
Frequency noise floor (long term)	1.10^{-20} @ 2000s
Accuracy	$< 10^{-19}$
Optical interferometer sensitivity to temperature	< 1 fs / °C
Central wavelength	1542,14 nm
(other wavelengths available in option)	
Physics package	19'' rack
Dedicated stabilized power supply included	
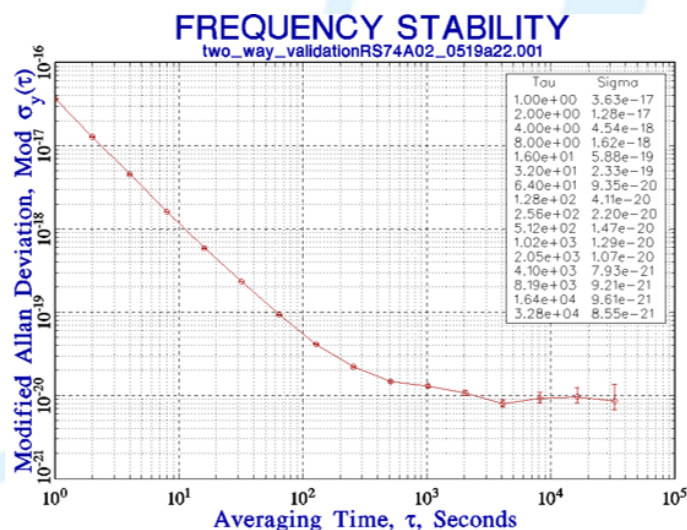
Modified Allan deviation of the relative frequency stability enabled by Muquans regeneration station

REFERENCES

- http://www.refimeve.fr/index.php/en/
- F. Guillou-Camargo et al, "First industrial-grade coherent fiber link foroptical frequency standard dissemination", Applied Optics, Vol. 57, No 25 (2018)

In collaboration with LPL (Univ. Paris 13) & LNE-SYRTE (Observatoire de Paris)

Refimeve+
Réseau fibré métrologique
à vocation européenne

UNIVERSITÉ **PARIS 13**

l'Observatoire de Paris — SYRTE
Systèmes de Référence Temps-Espace

Contact

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