

Report of Time and Frequency Activities from INTI

Diego Luna



2021-05-26

Organization of the Lab

Structure

- Time and Frequency is now a part of the Optical and Dimensional Department.

People

- *Carla de la Pina*: PhD student.
- *Fernando Yapur*: Physics Student. Frequency Comb
- *Griselda Mingolla*: Physicist. Frequency comb (and lasers)
- *Diego Luna*: Clocks, combs & services.

Organization of the Lab

Infrastructure

- 3 cesium clocks
- 3 GPS receivers
- 1 counter and 1 frequency generator for calibrations
- 1 phase comparison system (Multiplexer + counter)
- 1 NTP Server

Contribution to T&F networks

- SIM T&F
- UTC & UTCr, 3 clocks
- Red Nacional de Tiempo (RNT), 3 clocks

Clocks and receivers



CMC's since 2015

Calibration and Measurement Capabilities

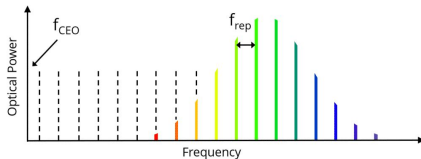
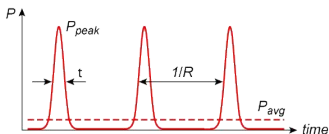
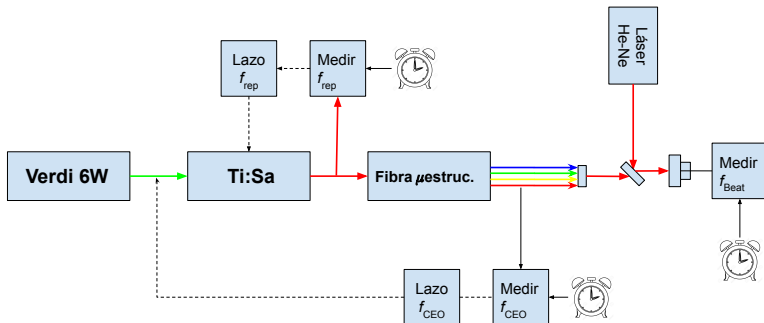
Time and Frequency, Argentina, INTI (Instituto Nacional de Tecnología Industrial)



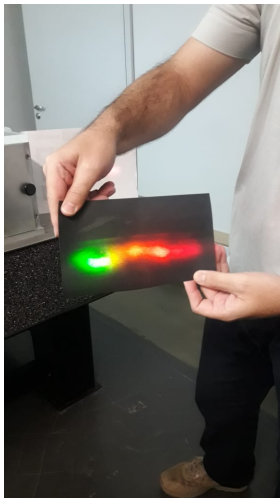
Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					NMI Service Identifier	Comments
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?		
Frequency	General frequency counter	Direct frequency measurement	5	5	MHz	Averaging time	600 s	9E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency counter	Direct frequency measurement	5	5	MHz	Averaging time	3600 s	2E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency counter	Direct frequency measurement	5	5	MHz	Averaging time	1 day	2E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency counter	Direct frequency measurement	10	10	MHz	Averaging time	600 s	9E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency counter	Direct frequency measurement	10	10	MHz	Averaging time	3600 s	2E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency counter	Direct frequency measurement	10	10	MHz	Averaging time	1 day	2E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.001	Approved on 02 March 2015
Frequency	General frequency source	Direct frequency measurement	1E-06	225	MHz	Averaging time	1 h	6E-12	Hz/Hz	2	95%	Yes	102.02.03.05.00.003	Approved on 02 March 2015
Time interval	Period source	Time interval counter	20	1E+09	ns	Slewing rate	> 0.5 V/hs	4	ns	2	95%	No	102.02.03.05.00.002	Approved on 02 March 2015
Time interval	Time difference meter	Time interval counter	20	1E+09	ns	Slewing rate	> 0.5 V/hs	6	ns	2	95%	No	102.02.03.05.00.002	Approved on 02 March 2015

The BIPM key comparison database, March 2015

Highlights for 2017-2020: Frequency Comb

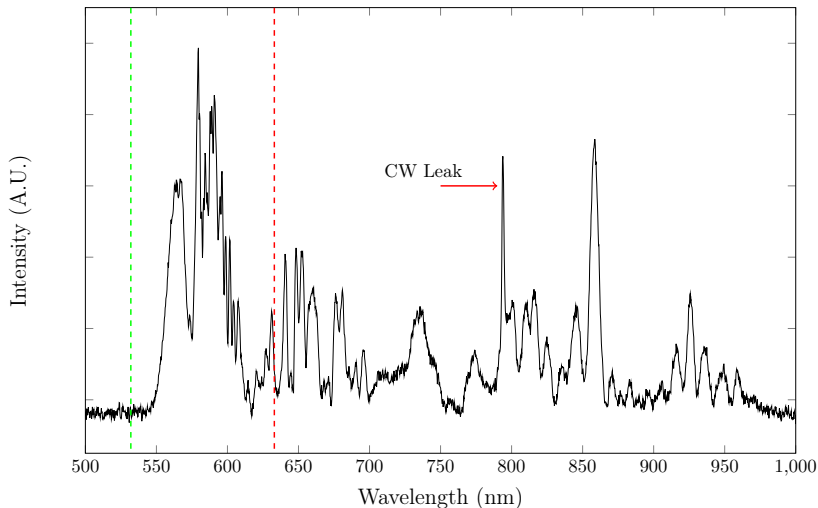


Highlights for 2017-2020: Frequency Comb



- March 2020: First visible spectrum
- Photo taken the last day before quarantine.

Highlights for 2019-2020: Frequency Comb



It is not yet a full octave. It is necessary to improve the coupling to the fiber.

That's all

Thank you!

