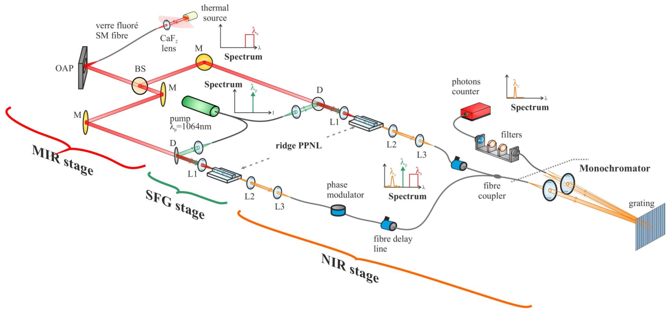
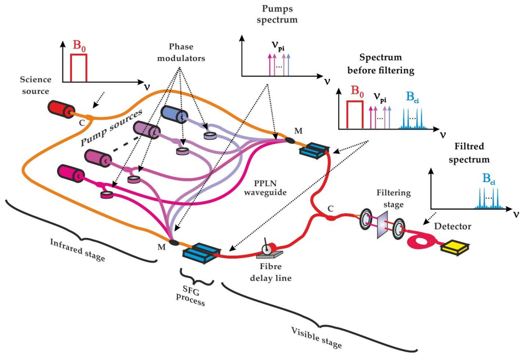
ALOHA@CHARA
Experimental developments

L. Lehmann, L. Delage, L. Grossard, F. Reynaud

Summary

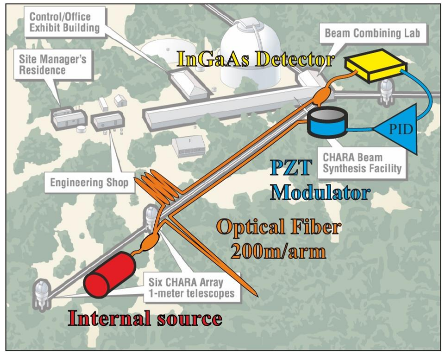


- In-lab :
  - High fringe contrast with black body source in L band



  - Multi-channels mode in H band

- On site :
  - OPD Stability test for fiber links



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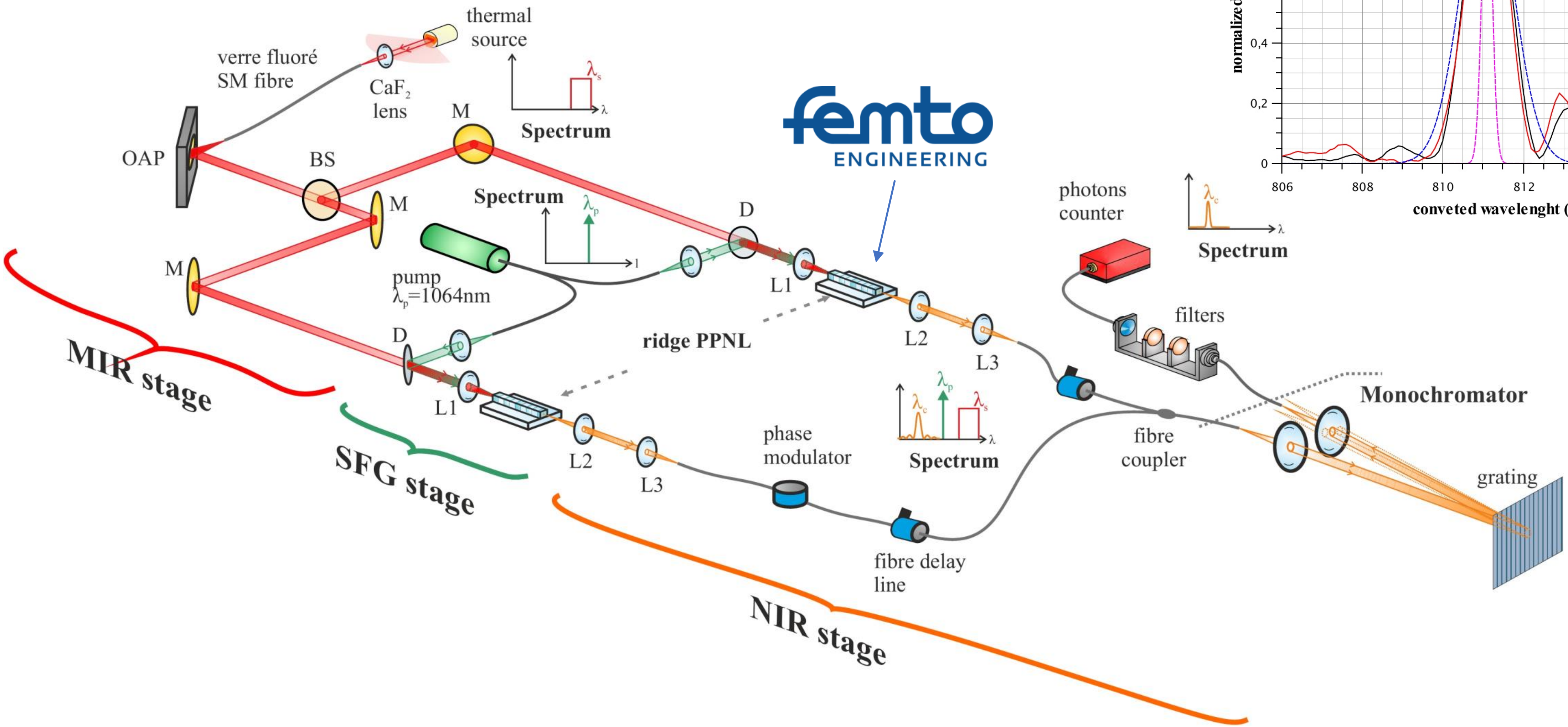
In lab:
High fringe contrast with black body source in L band in photon counting regime

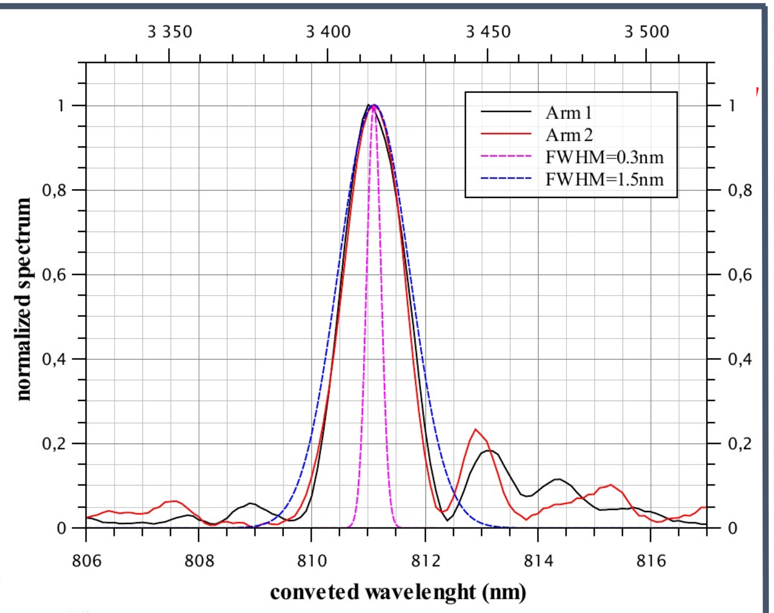
Objectives :

Test the repeatability of the SFG process

Experimental setup

~100pW/nm @ 3.4µm





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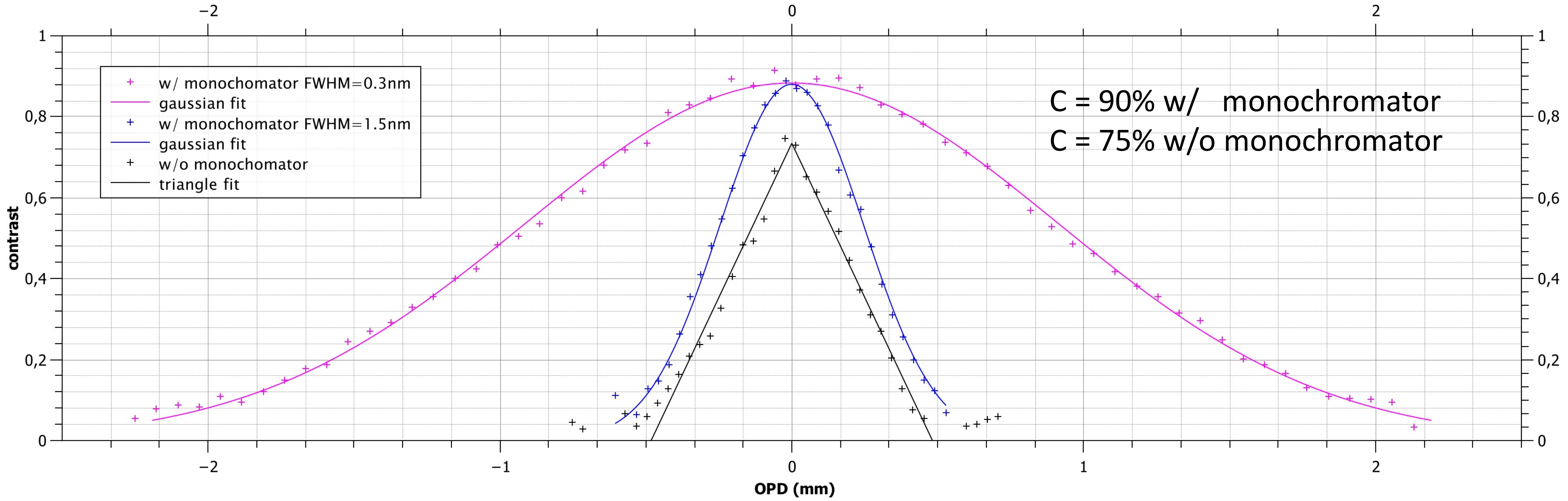
Visibility function



- New non-linear components with AR coating could improve :
  - Conversion efficiency
  - Contrast

Published

In lab: Multi-channels spectral mode in H band

Objectives :

Simultaneously study multiple spectral channels with ALOHA

Lehmann et al., *Multichannel spectral mode of the ALOHA up-conversion interferometer, MNRAS, 2018, DOI:*10.1093/mnras/sty648

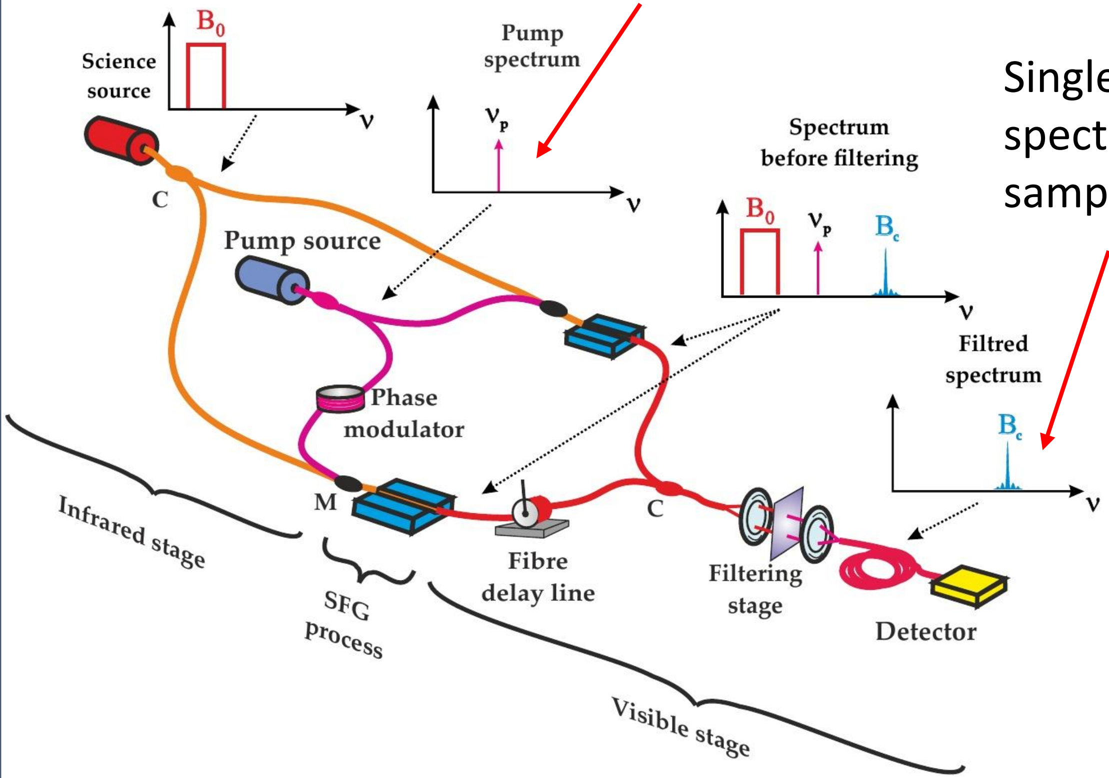
Published

Principle

Single channel

Single pump

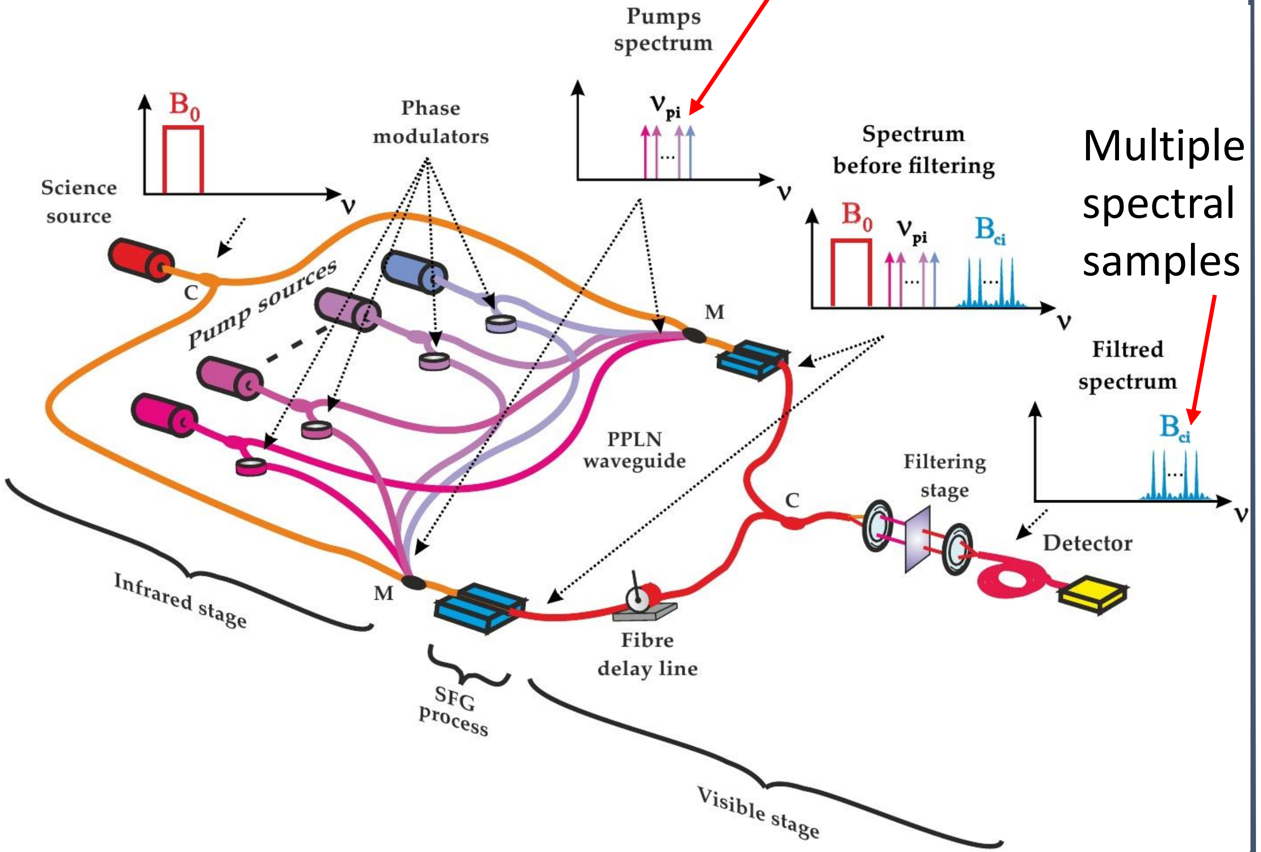
Single spectral sample



Multichannel

Multiple pumps

Multiple spectral samples



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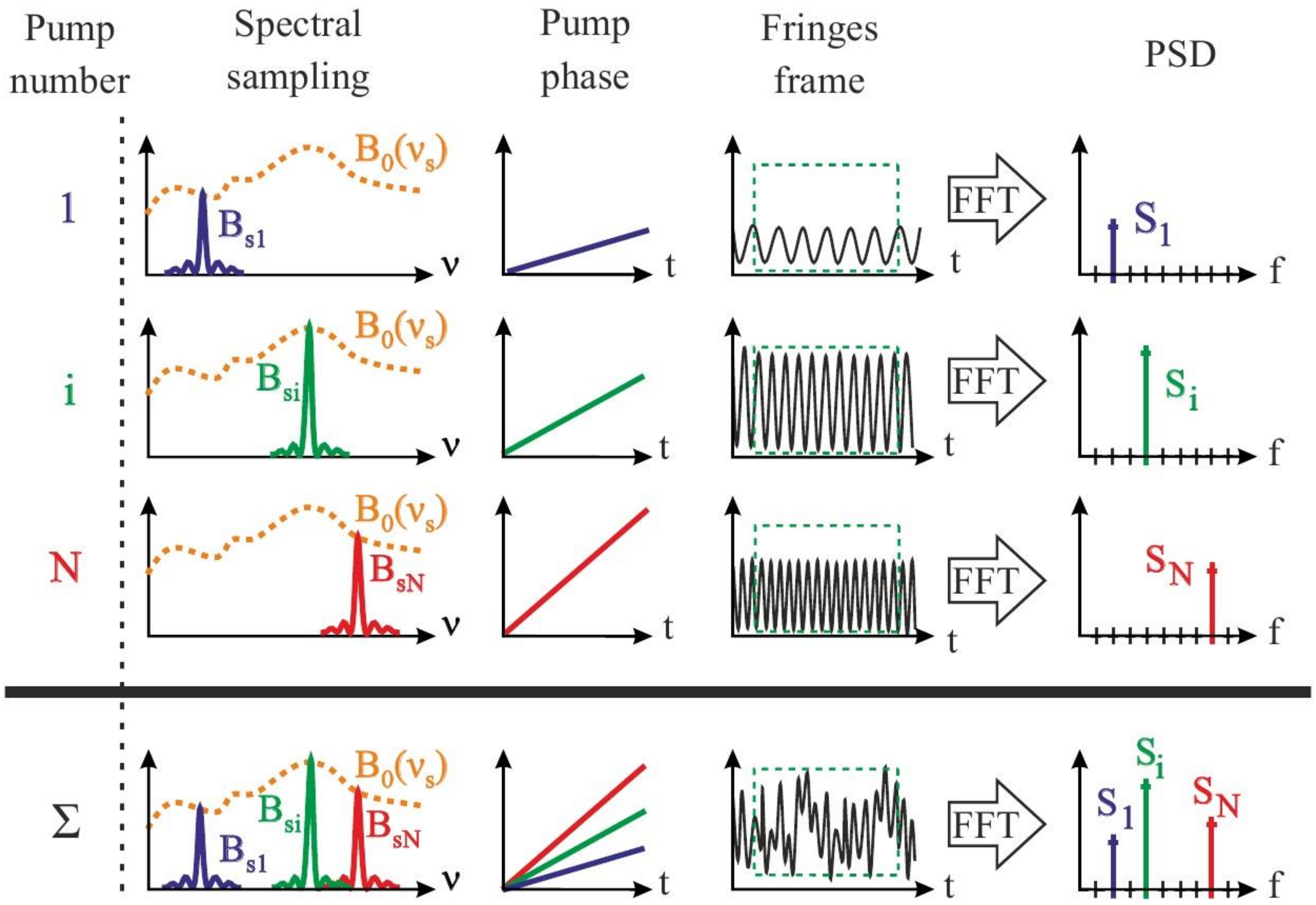
Data Process



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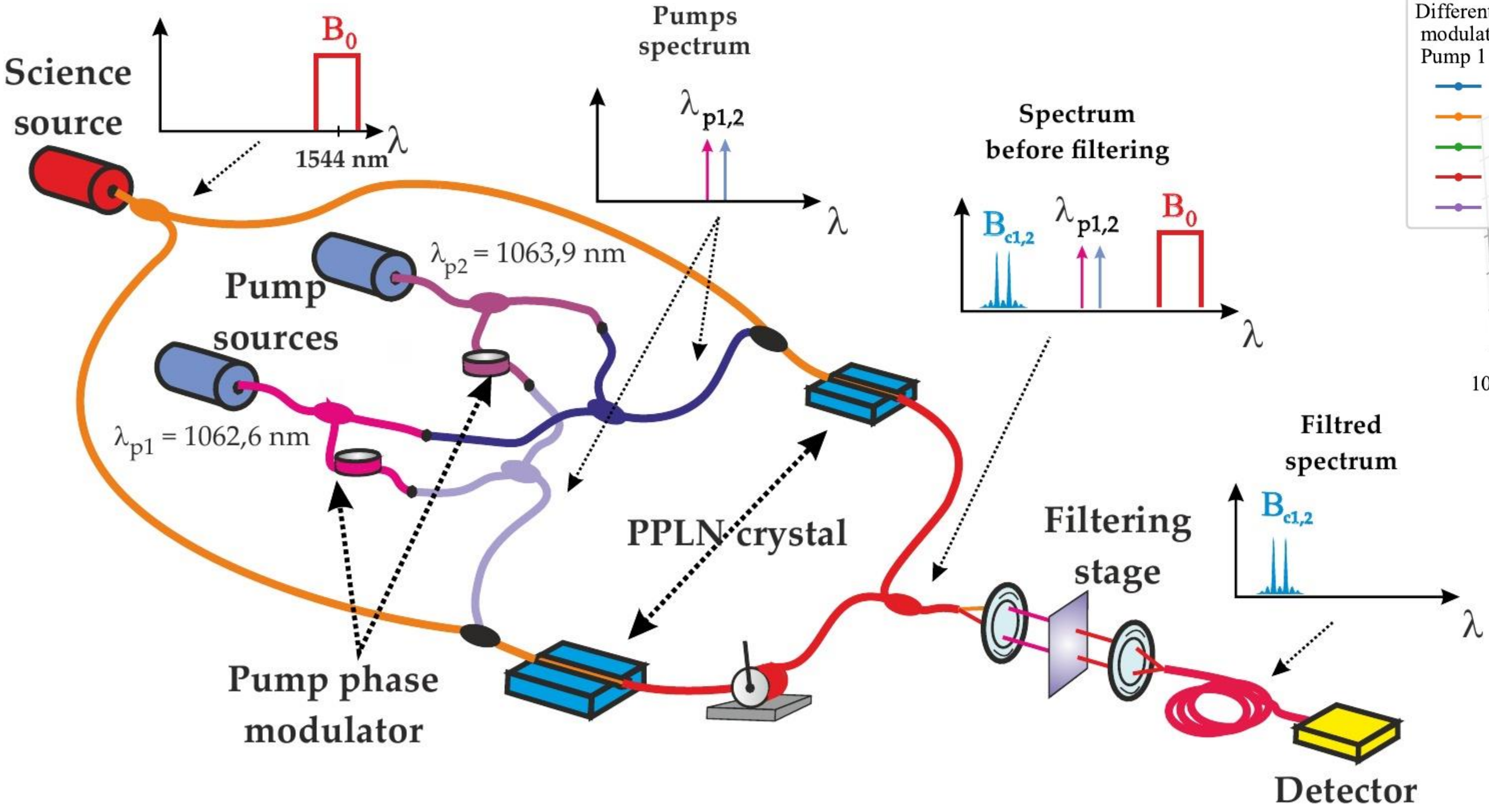
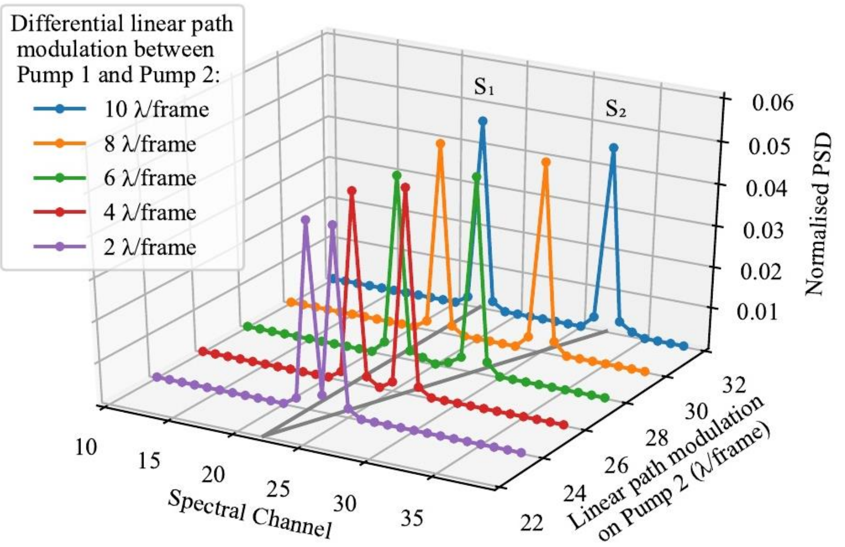
Experimental setup

Sample	λ_s	λ_p	λ_c
1	1554.0 nm	1062.6 nm	631.08 nm
2	1551.6 nm	1063.9 nm	631.14 nm





On sky test :

- Bad conditions (2016 & 2017)
- New attempt in 2018

To be published

On site :
Stability test for telescope fiber links

To be published

Out-door setup

Long term objective:

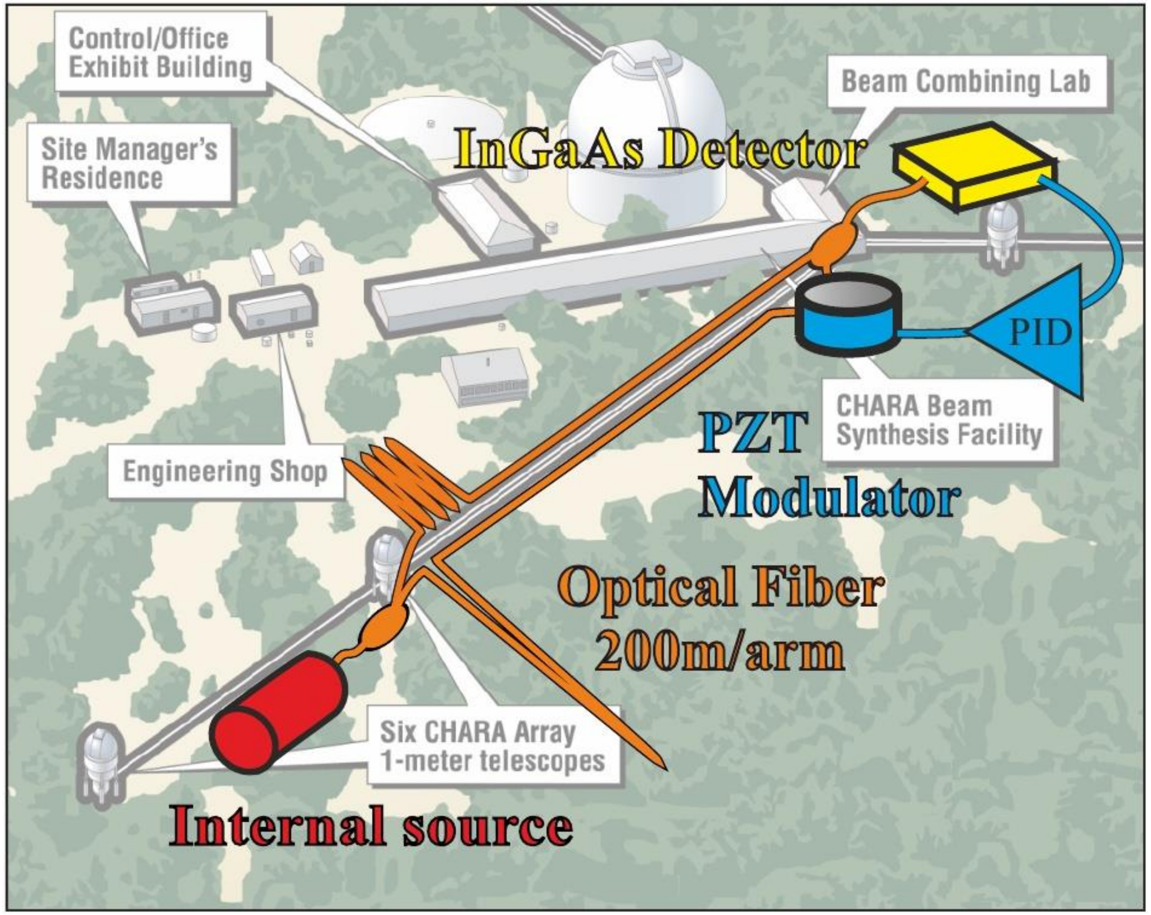
- Using optical fiber for lossless, polarization controlled, long distance light transport

Problem: Fiber length stability

Solution:

- Measure the OPD drift,
- Stabilized the OPD,

in a representative context



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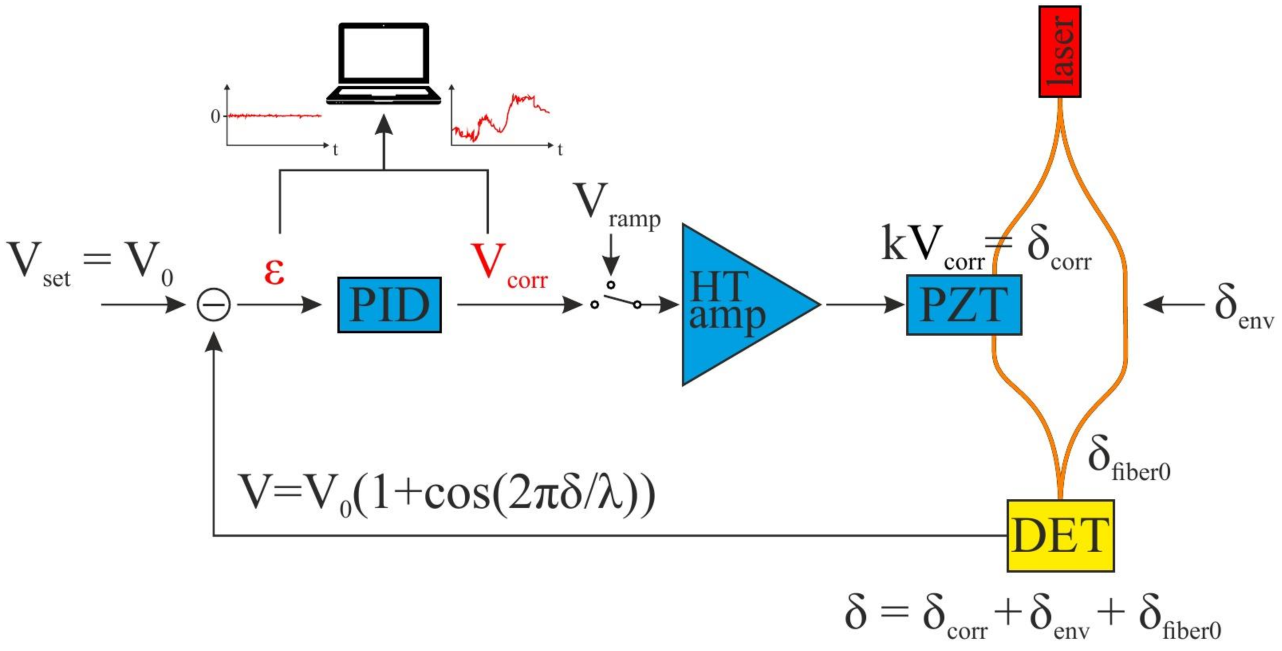
Servo control



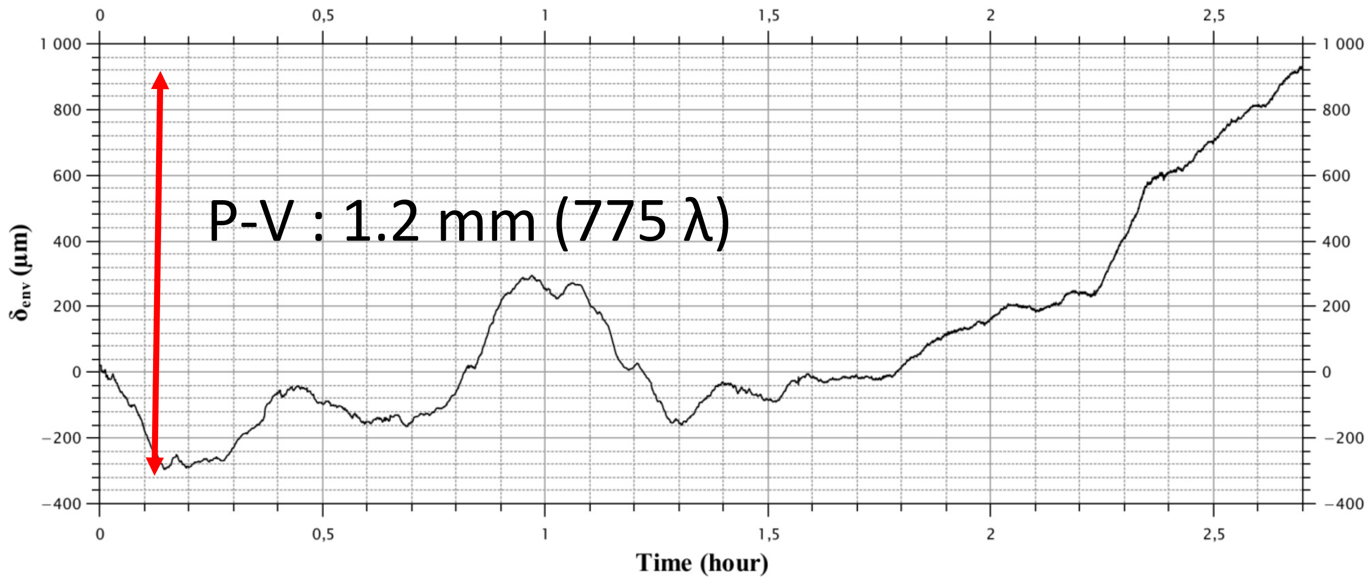
Calibration in open-loop

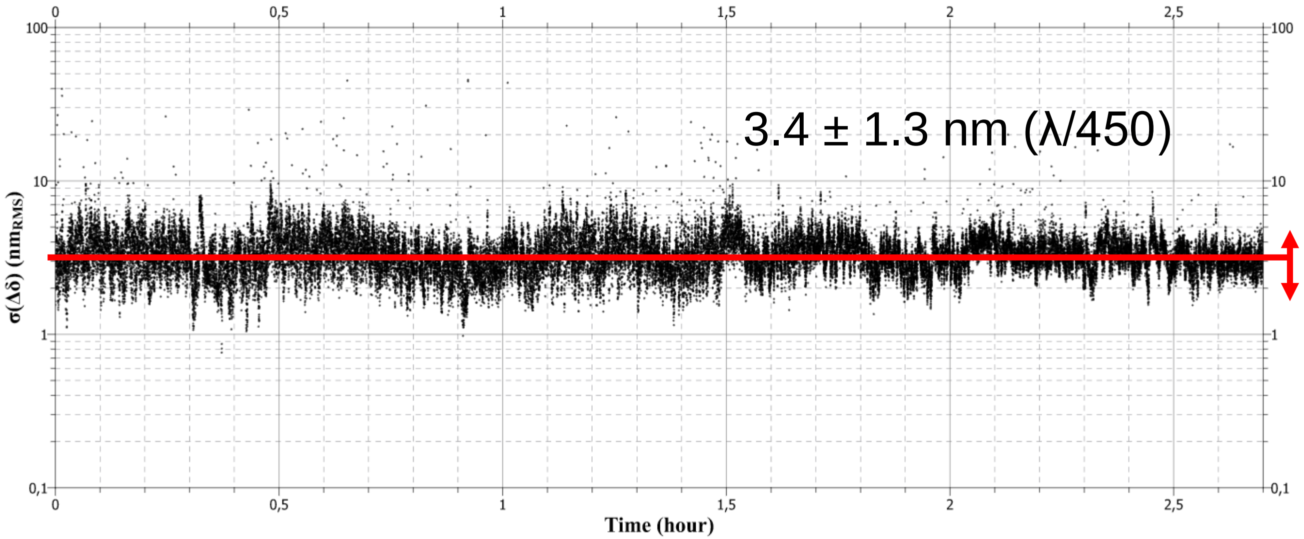
In closed-loop:

- Correction signal V_{corr} gives the OPD drift
- Error signal ε gives the stability

To be published

Results





ODP Drift:
Compatible with fiber delay line

Stability:
Compatible with Interferometry !

Short term perspectives

- New nonlinear component with AR coating for L band
- On-sky sensibility test in L band @ C2PU (Observatoire de la côte d’Azur) before implementation on the CHARA array

Acknowledgment

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  - the Institut National des Sciences de l'Univers (INSU),
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