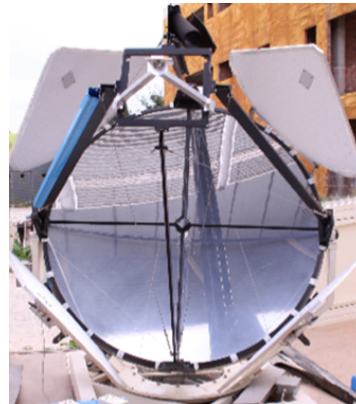


Status of IFAE/UAB Raman LIDAR



Lluís Font and Markus Gaug

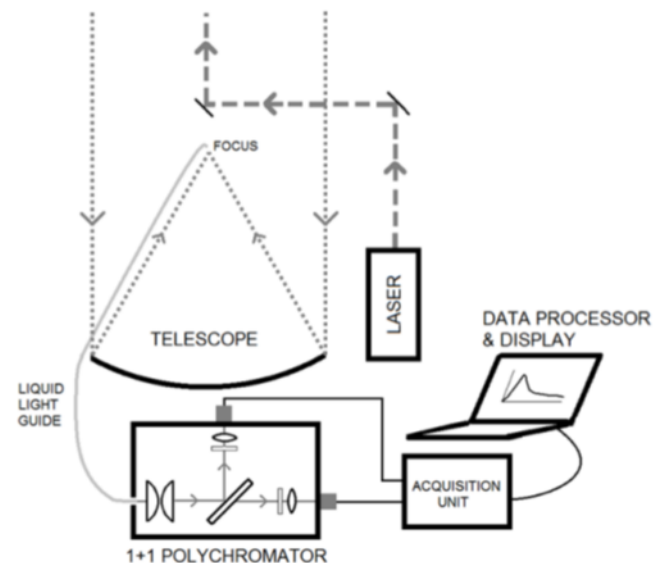
UAB & CERES-IEEC

Central Calibration Facilities meeting
Barcelona 20-23 June 2016

Overview

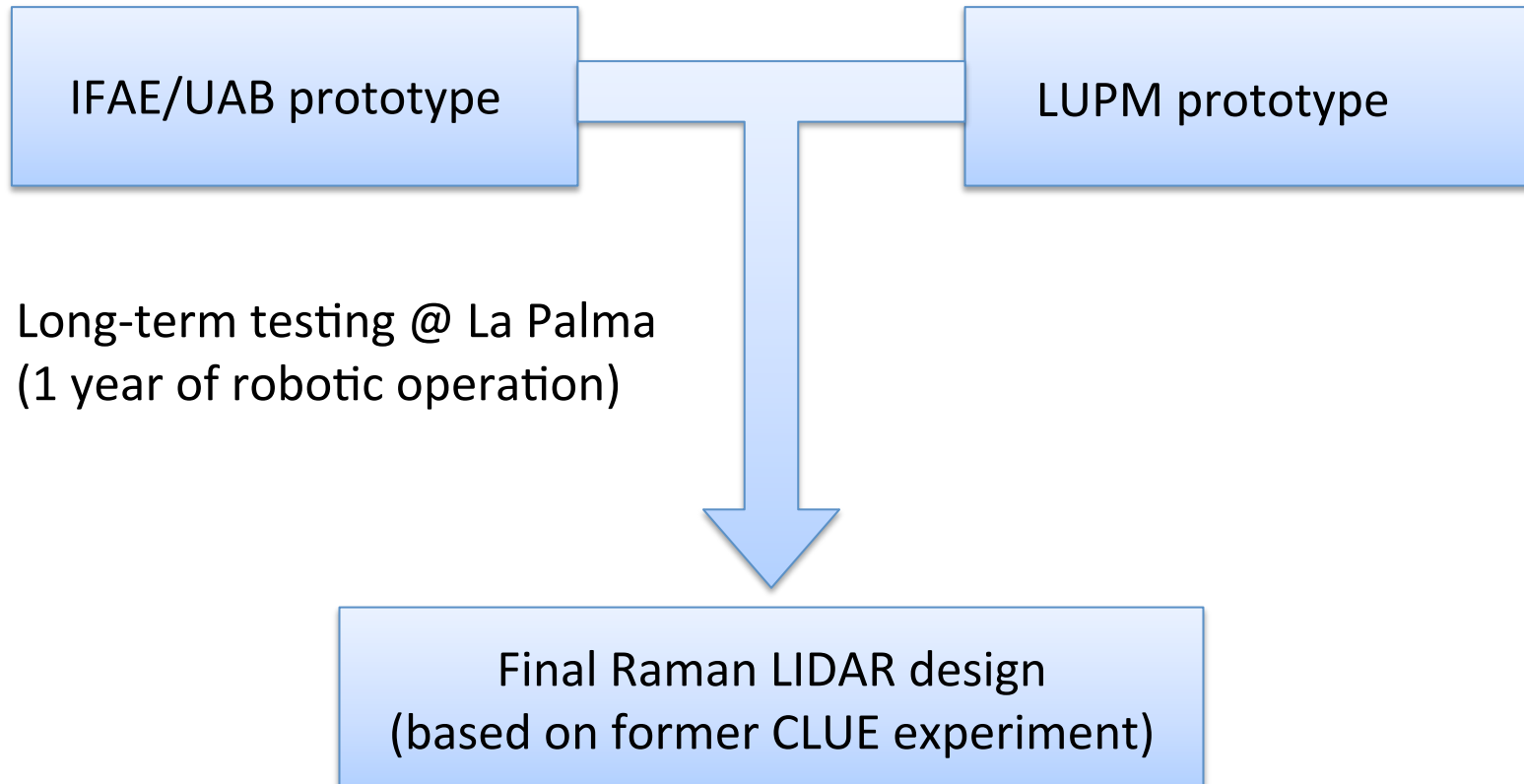
The concept

- Recycle a former CLUE telescope and container to build and advanced Raman LIDAR optimized for CTA
- 2 + 2 configuration:
 - 355 nm + 532 nm elastic channels
 - 387 nm + 607 nm N₂ Raman lines
- Atmospheric molecular and aerosol transparency as a function of range and wavelength.
- Laser: Brilliant Compact Q-Switched Nd:YAG 1064nm + frequency tripler head Rate:10 Hz Pulse:5 ns Beam divergence:0.5 mrad
- Parabolic mirror $f = 180 \text{ cm} \Rightarrow f/D = 1$
- Dichroic guiding mirrors $\rightarrow$ coaxial
- Polychromator home made
- Acquisition: standard LICEL units



Overview

The strategy



Overview

The situation

Funding for LIDAR prototype still is insufficient this year (as all Spanish funding proposals in 2016).

Funds for final LIDAR will come from FEDER funds in 2017-2018.

The team

- + Markus Gaug (UAB)
- + Oscar Martínez (IFAE) (Eng)
- + Oscar Blanch (IFAE)
- + Oriol Calpe (UAB) (Undergraduate)
- + Michele Doro (INFN Padova)
- + Lluís Font (UAB)
- + Merve Colak (IFAE) (PhD student)
- + Scott Griffiths (IFAE) (Postdoc)
- + Manel Martínez (IFAE)

Status prototype

Hardware

- Mirror characterized
- Liquid light guide characterized
- Guiding mirrors (dichroic) + alignment in zenit. Monochromator used
- Driving system not robotic yet
- ✓ • **Polychromator finished. Characterization studies on-going**
- Laser being repaired. Near range solution and fine-alignment postponed. Back on track soon (within 2 weeks)

Status prototype

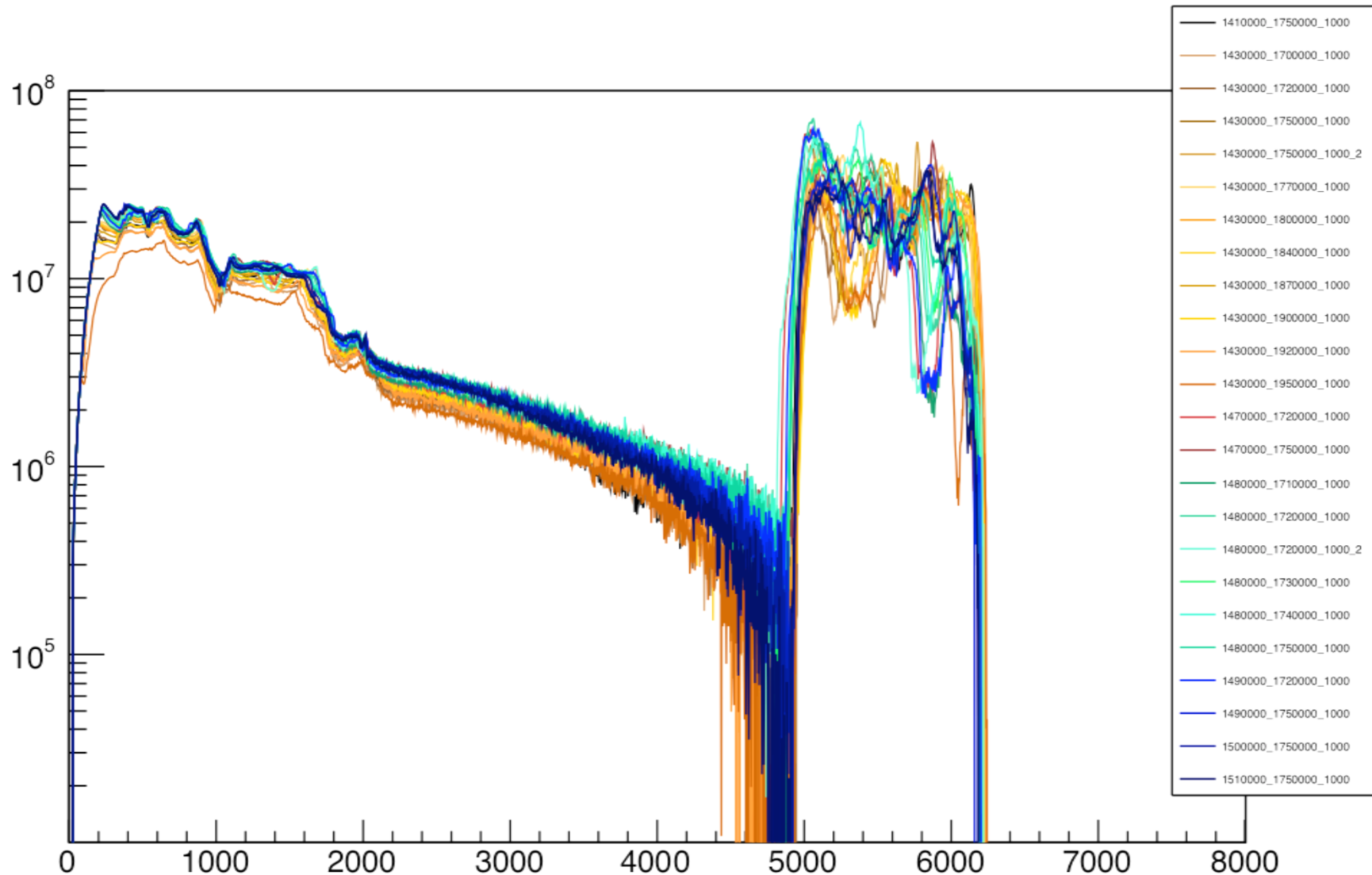
Software

- Library to read Licel files ready
- Internal communication translated from Labview to C (in process)

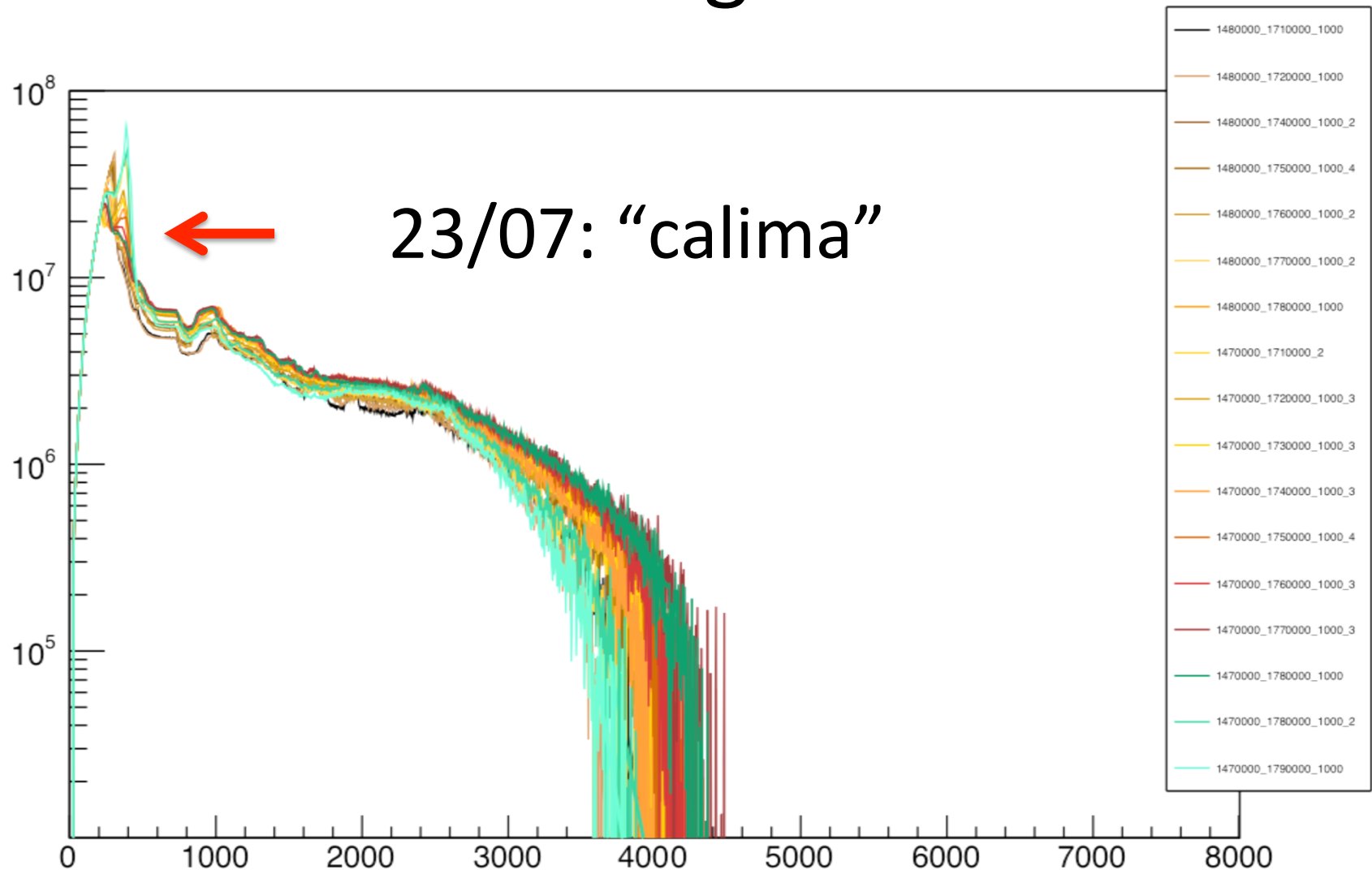
Documentation

- Finished one bachelor thesis on pre-alignment (Eudald Font)
- **Another bachelor thesis on polychromator characterization is on-going (Oriol Calpe)**
- Constantly update a LIDAR TDR
- ICDs created (except for the one with ACTL)

LIDAR alignment



LIDAR alignment



Documentation

UNIVERSITAT AUTÒNOMA DE BARCELONA

TREBALL DE GRAU DE FÍSICA

Alineament de l'UAB-IFAE Raman LIDAR

Autor:
Eudald FONT

Director:
Dr. Markus GAUG
Tutor:
Dr. Lluís FONT



Alineament de l'UAB-IFAE Raman LIDAR i solucions pel abast proper

Autor:
Oriol Calpe Blanch

Director:
Dr. Markus Gaug
Tutor:
Prof. Lluís Font Guiteras

Technical Design of a Raman LIDAR for Atmospheric Calibration for the Cherenkov Telescope Array

O. Abril, O. Blanch, J. Boix, V. Da Deppo, M. Doro, E. Font Pladevall,
L. Font Guiteras, M. Gaug, A. López-Oramas, M. Martínez

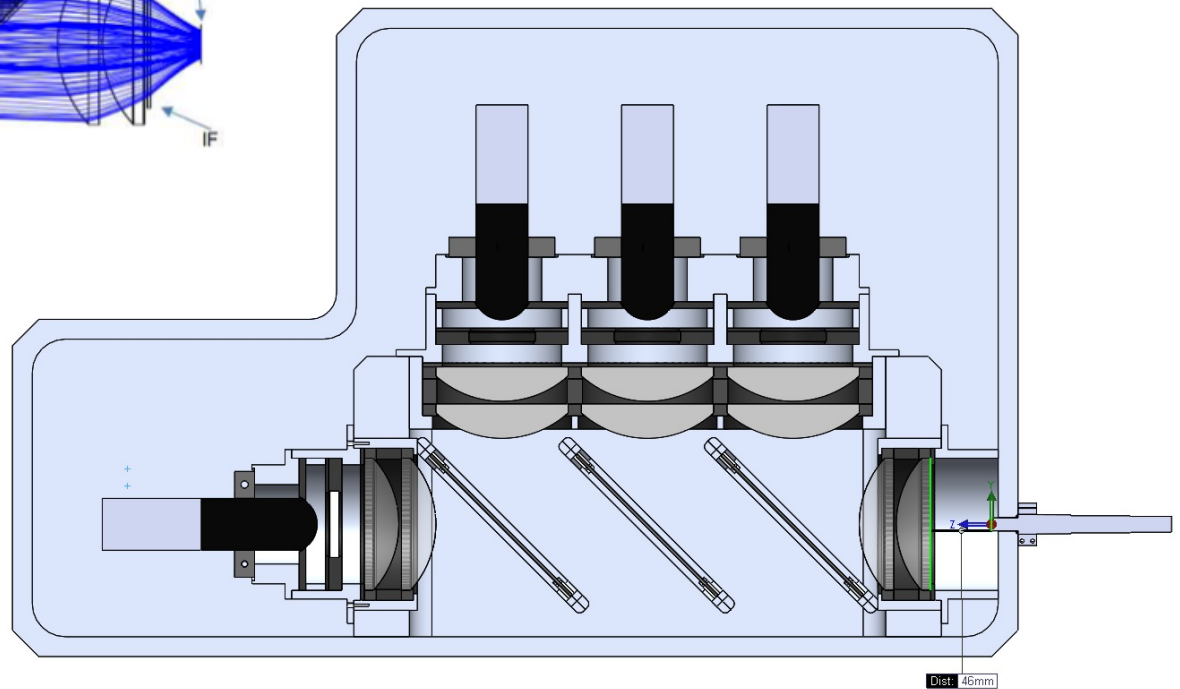
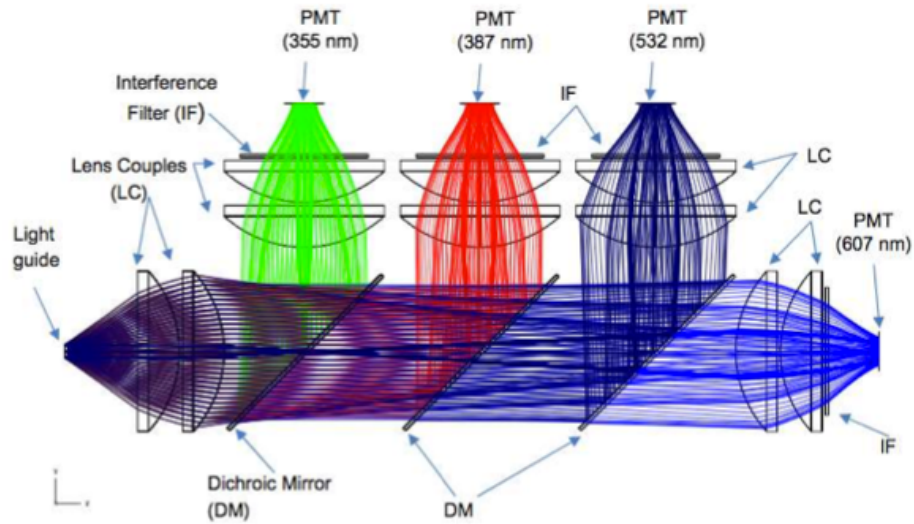
April 29, 2015

Abstract

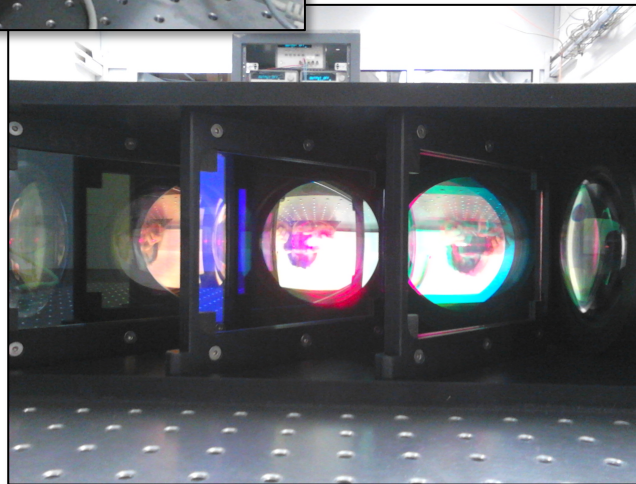
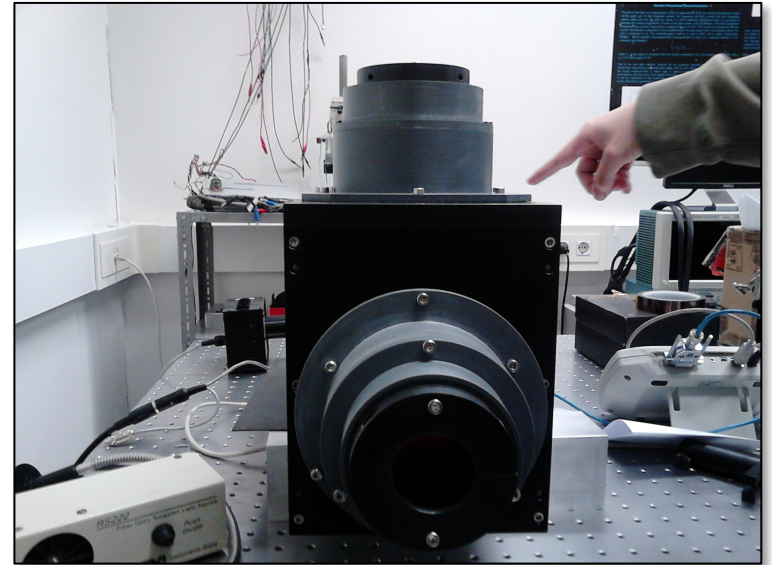
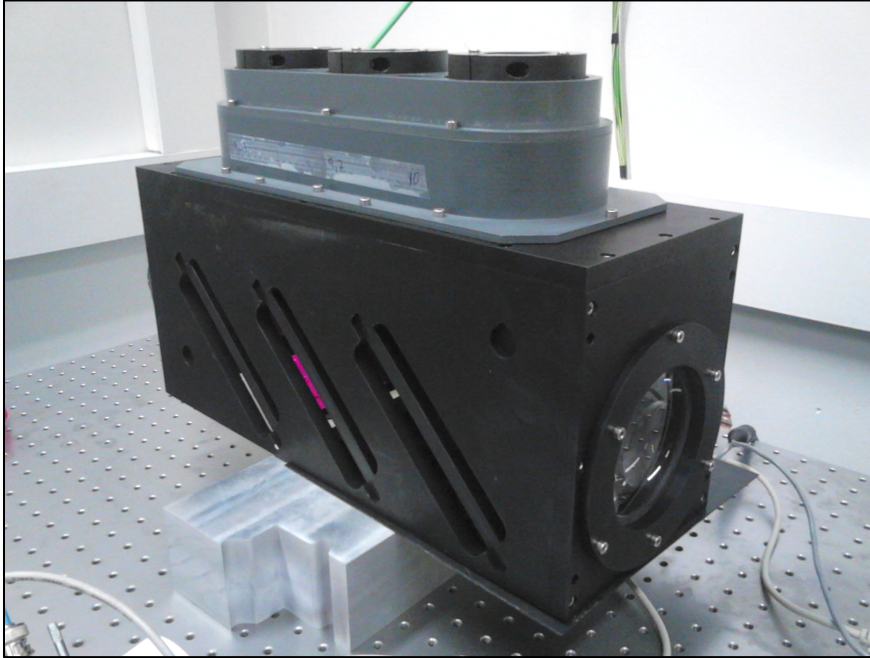
This document outlines the technical design of the UAB/IFAE Raman Lidar for the atmospheric calibration of CTA.

Reference	I-INFRA-NORTH-COM-3000
1	INFRA-NORTH
2	COM
Document Title	IFAE/LUPM/UAB Raman LIDAR location within array
Location	
1.1.1 Description of the item	
The LIDAR must hold a minimum distance of 100 m from any LST, and a minimum distance of 50 m from any MST. It should be close to a power and data line.	
Device dimensions closed: 1 TEU container: 20 ft x 8 ft x 8 ft (6 m x 2.4 m x 2.4 m)	
Device dimensions opened: 6 m x 7.2 m x 2.4 m	
Device mass: max. 25 t (will be specified later on)	
Overall foundation dimensions: 7m x 7.2 m	
Grounding: INFRA needs to provide an earthing electrode	
Cable (ducts) through the foundations: both data and power ducts (separated) need to arrive in the middle of the side part (the one which is 7m long)	
Allowed maximum foundation tilting: max. 0.5 degree	

Polychromator

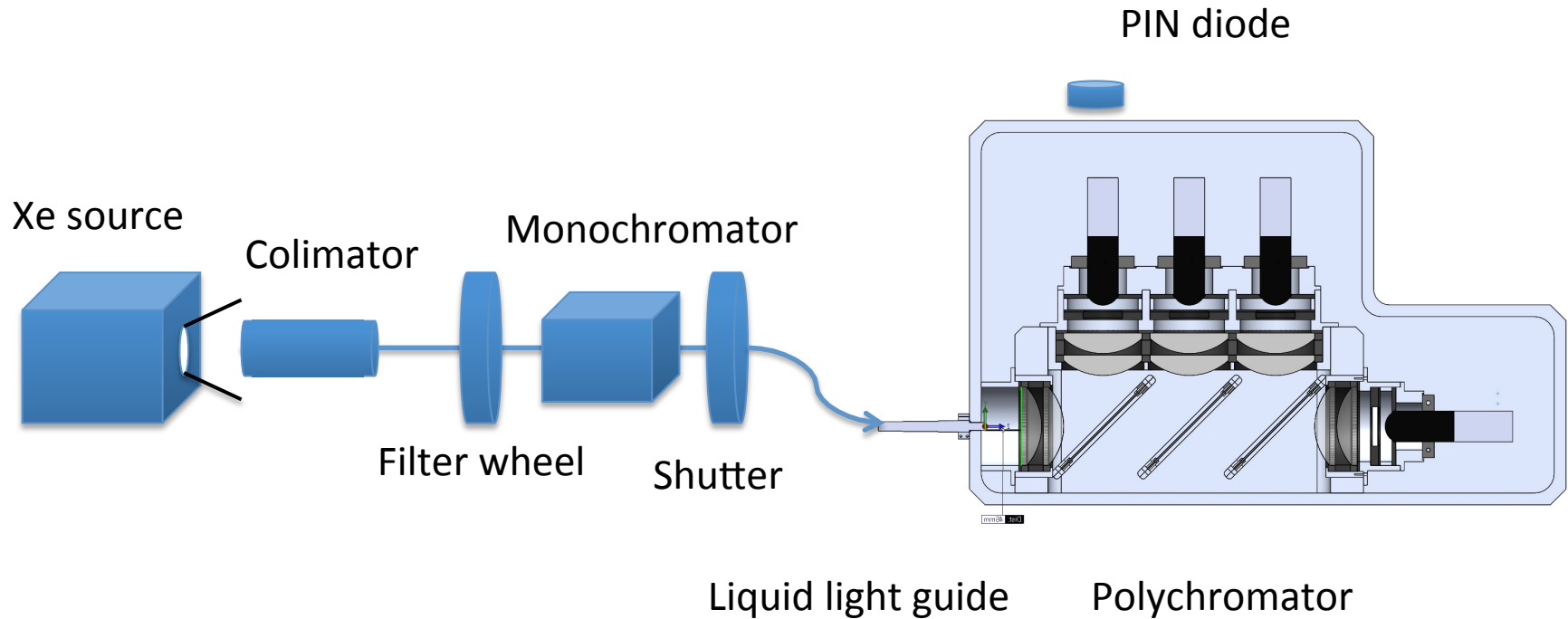


Polychromator



Polychromator

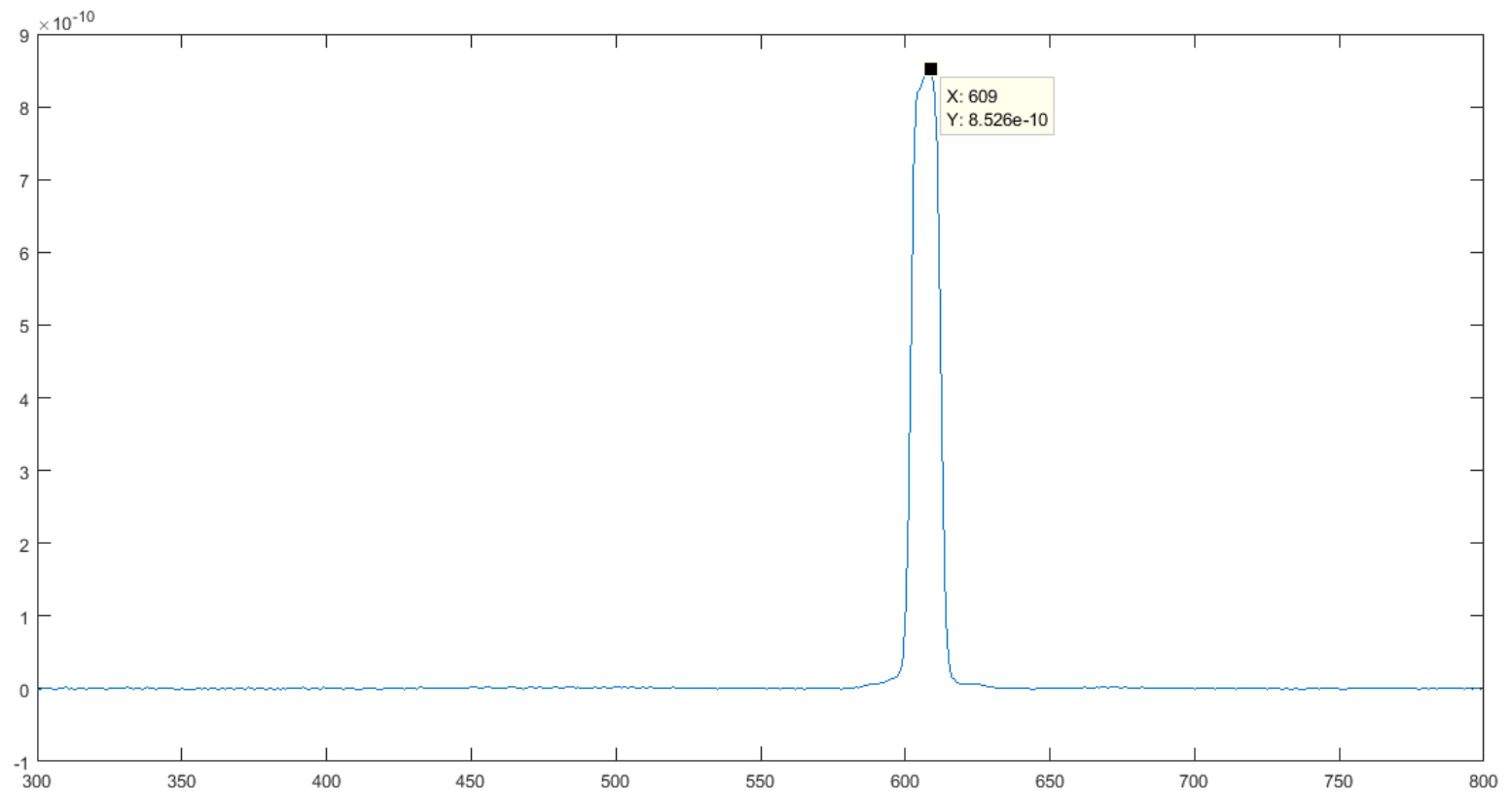
Characterization test set up



Polychromator

Preliminary results

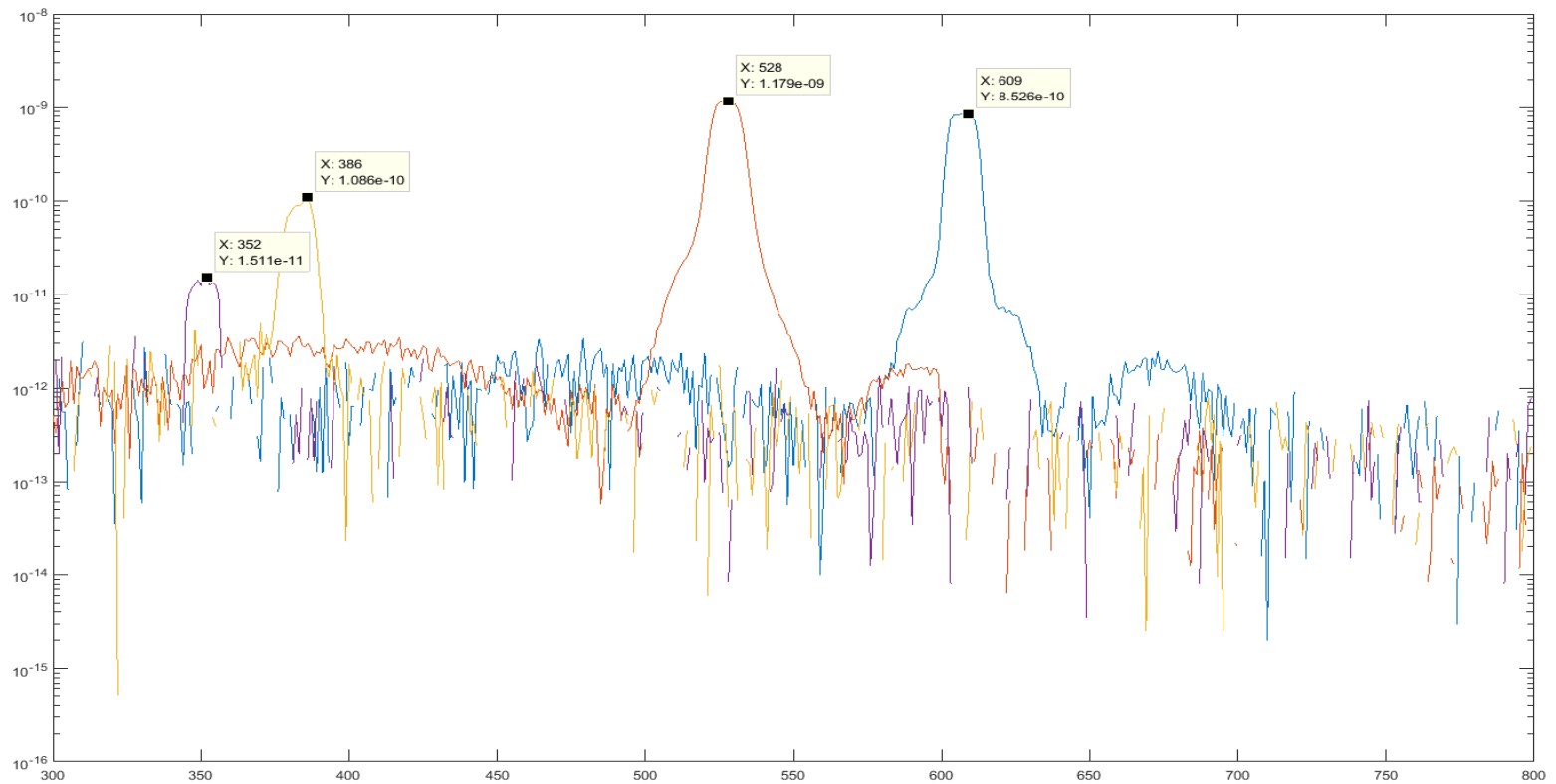
607 nm



Polychromator

Preliminary results

355nm 387nm 532nm 607nm



Outline

- Polychromator characterization will finish soon (2 weeks).
- Near range solution and fine alignment will start before summer holidays.
- Making it robotic.
- Prototype should be ready for long term testing by mid 2017