

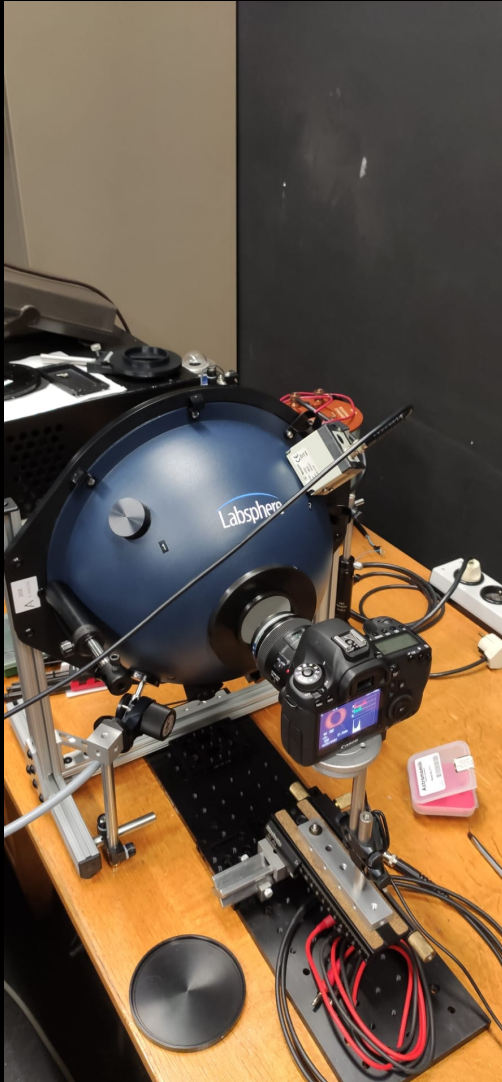
# PLIP: Lessons learned from the last March observation campaign

## A photograph of a metal box containing two cameras and a power supply unit, set against a snowy background. The box is open, revealing two cameras with lenses attached, positioned side-by-side. Below them is a power supply unit with various cables connected. The background shows a snowy landscape with trees and a fence.

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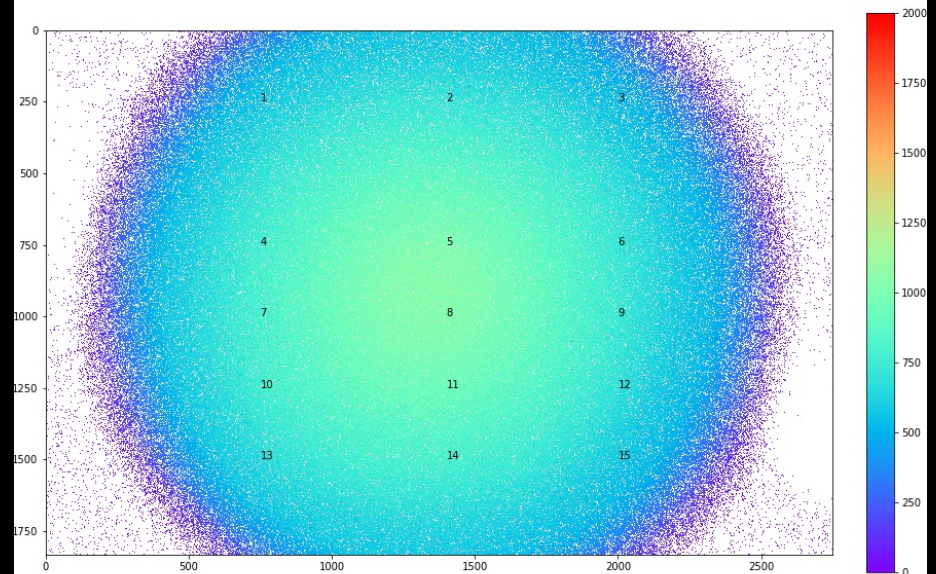
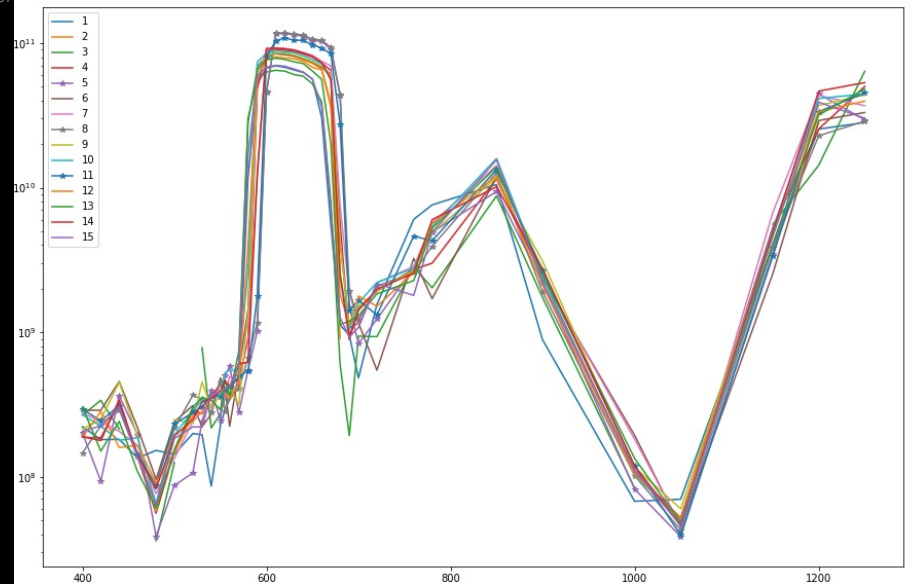
# Calibration in house (flat and filters)



- ✓ Double-monochromator to perform spectral flats
- ✓ Stable lamp to perform white flats
- ✓ Homogenous flat-fields using the integrating sphere
- ✓ Stable silicium detector to control the stability of the lamp

# Filters characterisation

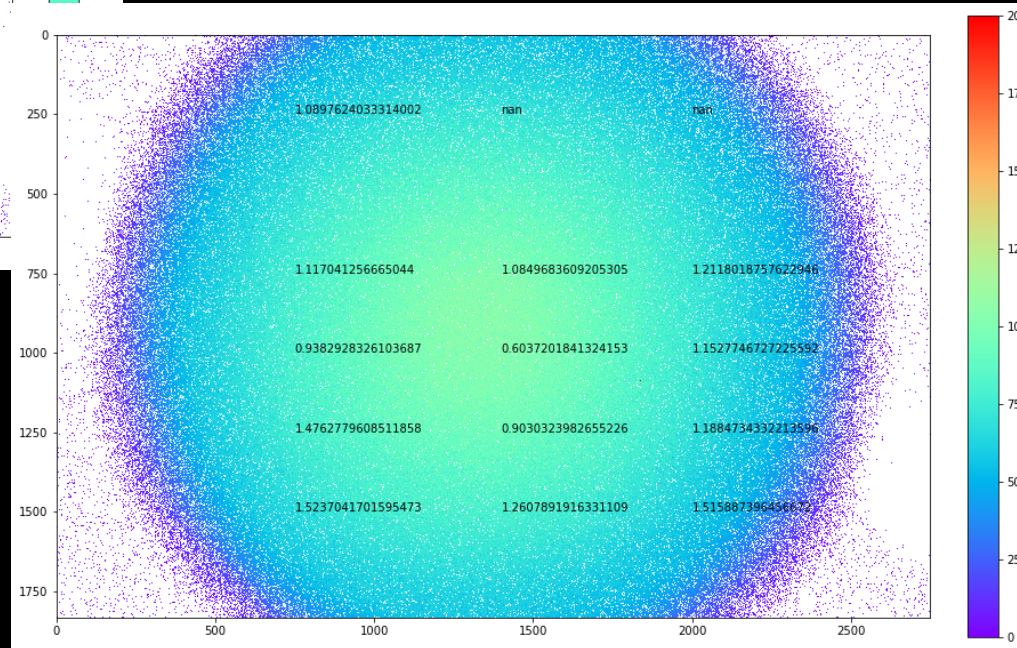
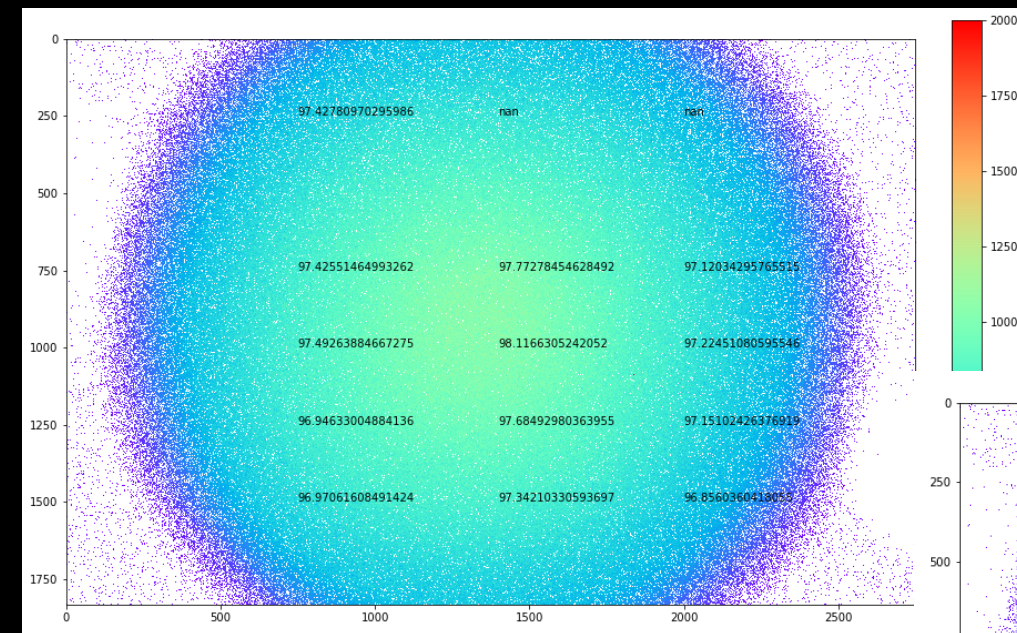
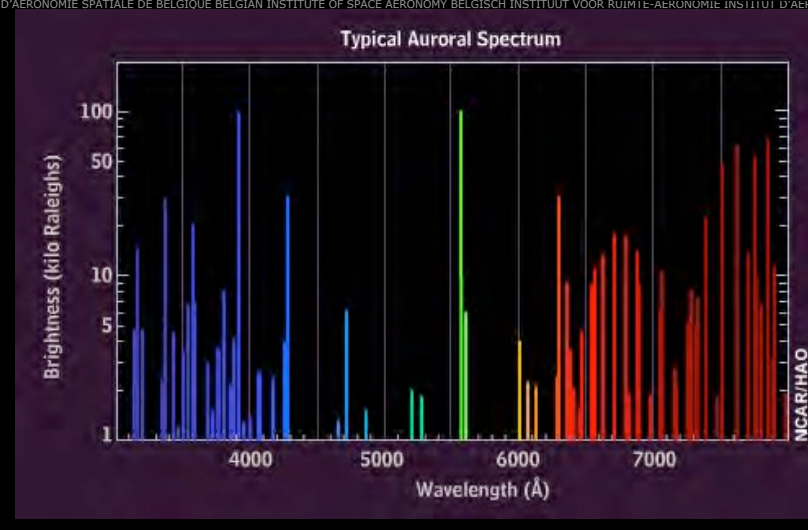
- ✓ Detector is pretty homogenous
- ✓ F/2.8 optics system so there a passband shift at the edge
- ✓ Important contribution of the infrared (that might be a problem)





# Filter “purity”

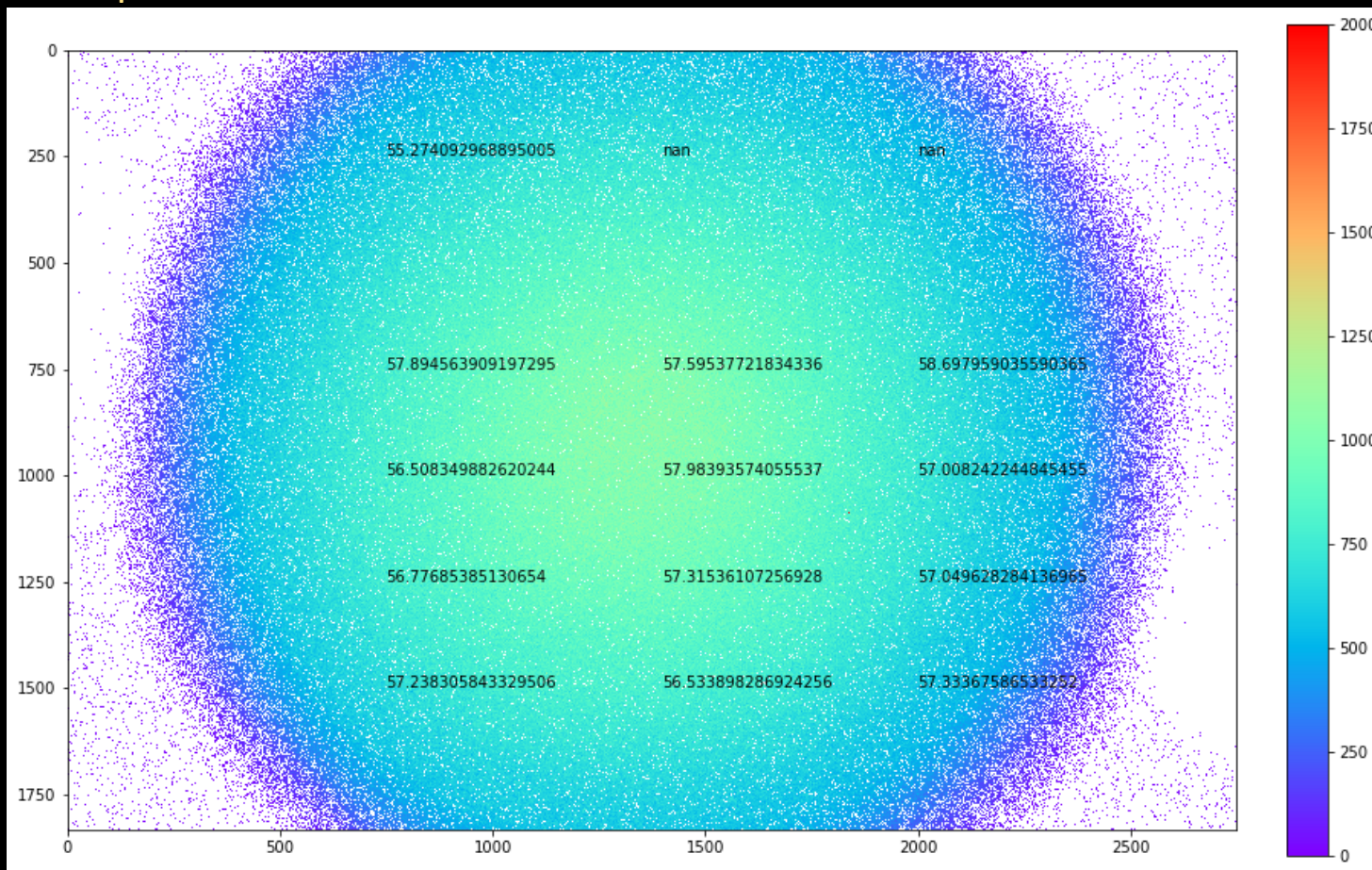
- ✓ Ideal case: only green, red and blue spectral lines





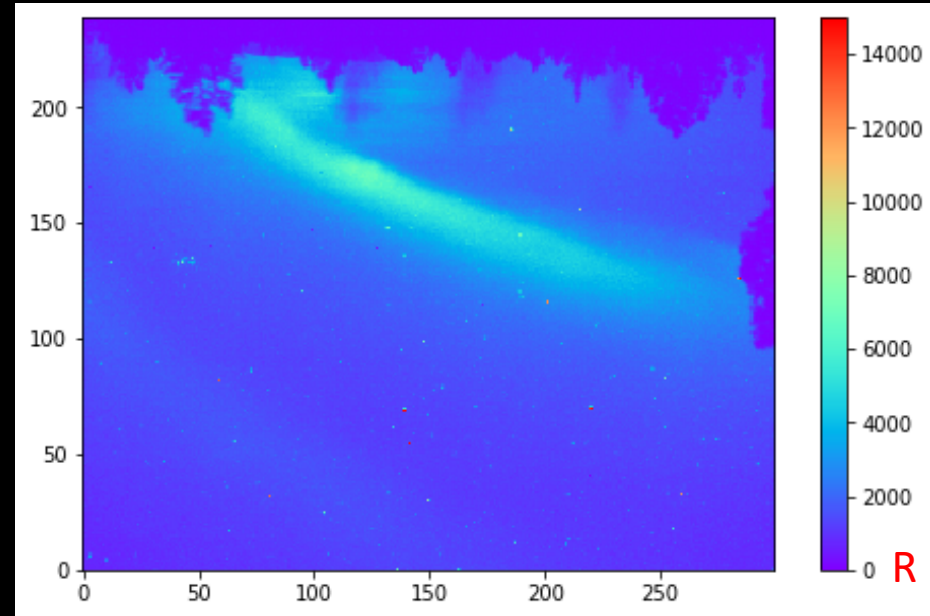
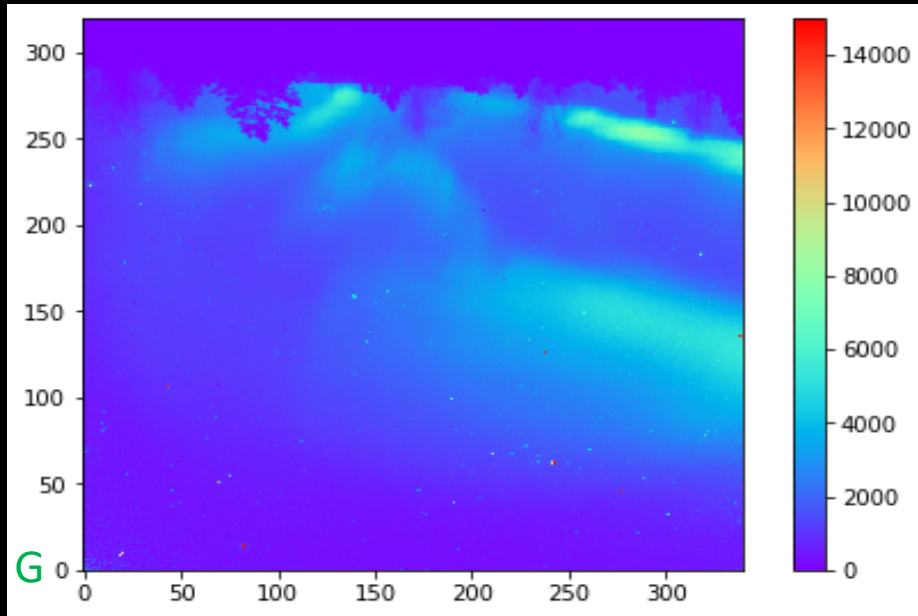
# Filter “purity”

- ✓ More real case: 3 previous spectral lines, Halpha and NIR, drops below 60% for the red line



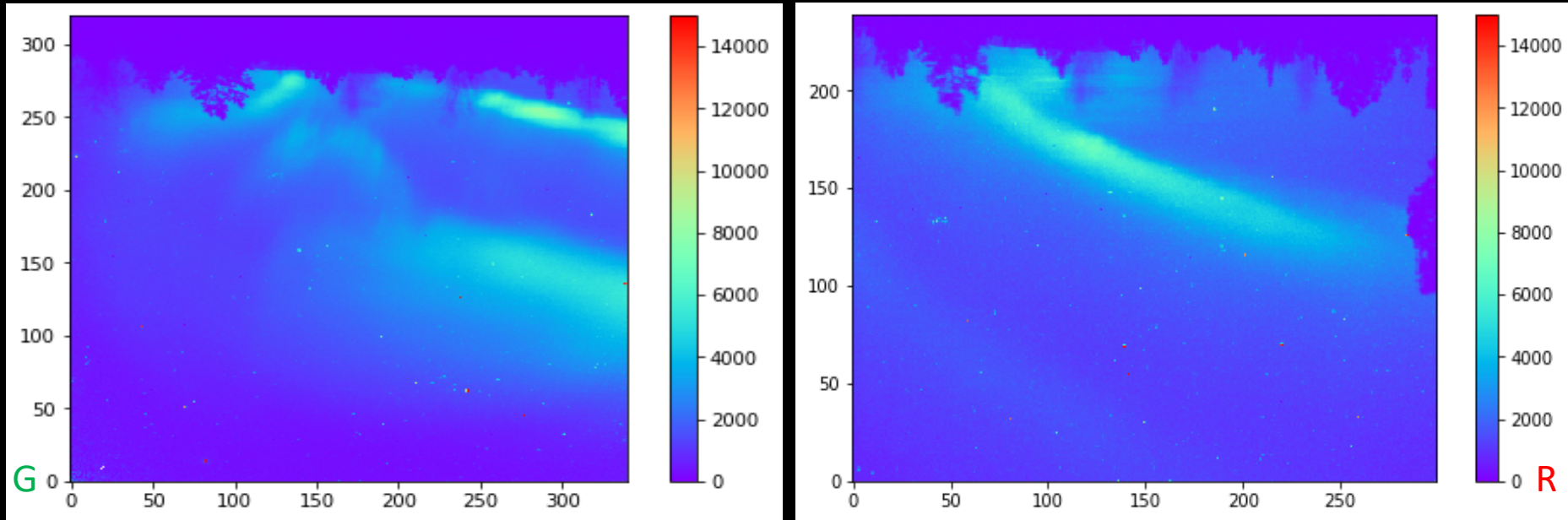
# Results from the March observations

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- ✓ Very few auroras during these 3 nights...
- ✓ PLIP is difficult to handle (filters change, gps setup, cold, etc...)
- ✓ Quite a lot of clouds on the horizon

# Results from the March observations



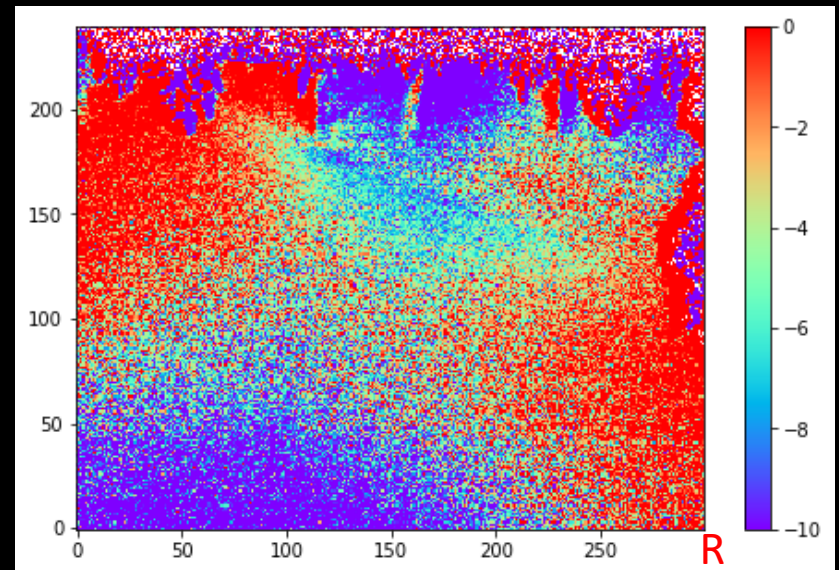
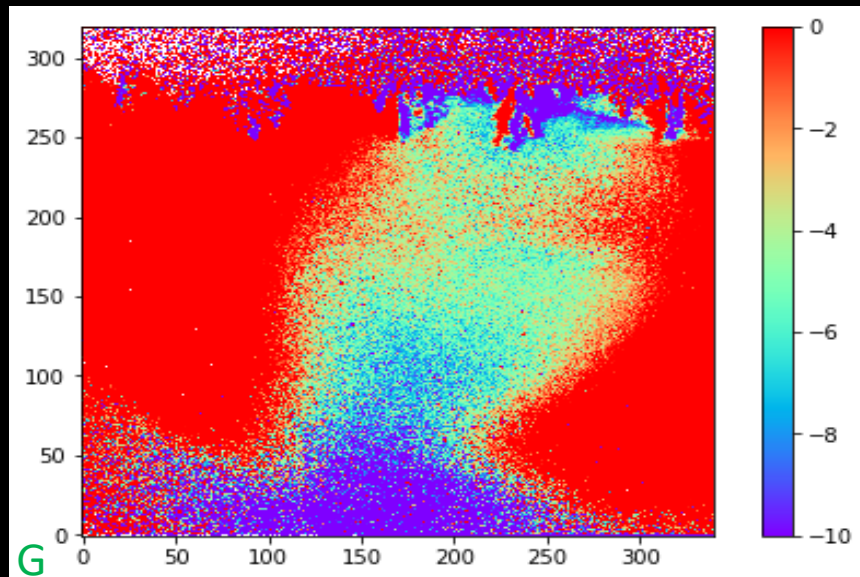
✓ What can we measure actually?

- ✓ Calibration using the masterdark and masterflat (from our lab)
- ✓ Access to the DoLP with only two linear polarisation filters

$$DoLP = \frac{I_+ - I_-}{I_+ + I_-}$$



# Results from the March observations



- ✓ Slight discrepancies of DoP at the auroras location between Green and Red images, 4~5% compared to 8~9%, respectively (Relative difference of about 4% then)
- ✓ BUT it is not very conclusive...
  - ✓ Impossible to have a reference on deepsky (noise level), offset of the detector?
  - ✓ Signature of the aurora pretty clear for the red, not really the green
  - ✓ What about contribution from others lines?

# PLIP 2.0

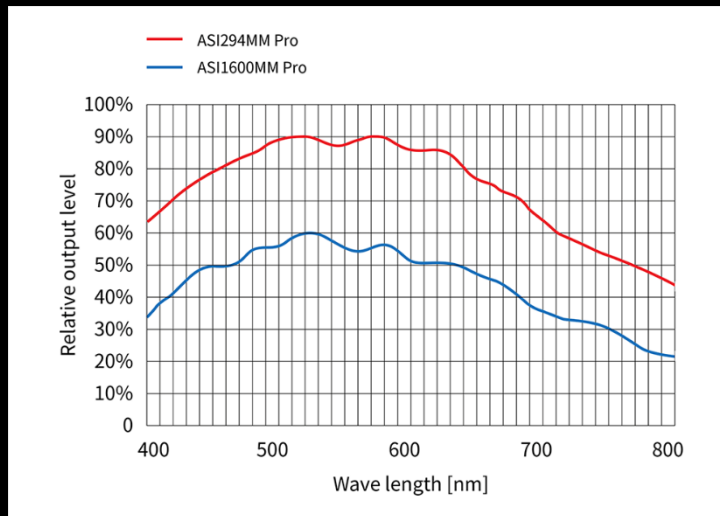


- ✓ Using commercial cameras, we are limited with the Bayer matrix (RGGB)
- ✓ Low resulting QE
- ✓ Commercial filters are either too large ( $> 100$  nm) or does not contain the auroral spectral lines (more for astrophotography, H $\alpha$ , SII and OIII)
- ✓ Difficulty to change filters manually (cold, cameras manipulation, etc)



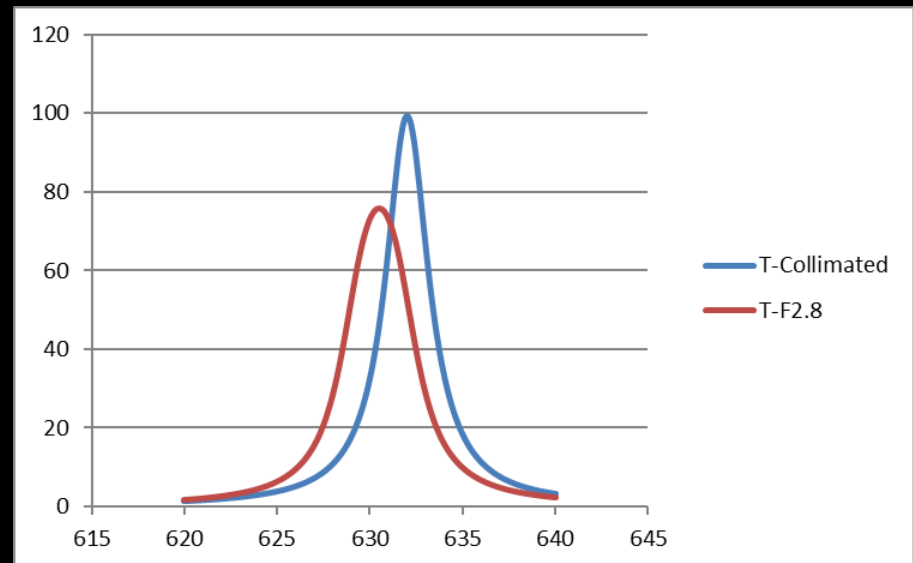
# PLIP 2.0

- ✓ Instead of the canon 6D, we will use some cooled ASI cameras (294mm pro)
- ✓ Monochrome camera (no problem with a Bayer matrix) with high QE



# PLIP 2.0

- ✓ Instead of the canon 6D, we will use some cooled ASI cameras (294mm)
- ✓ Monochrome camera (no problem with a Bayer matrix) with high QE
- ✓ Filter wheel for some special filters dedicated to the spectral lines and for our optical F/2.8 system

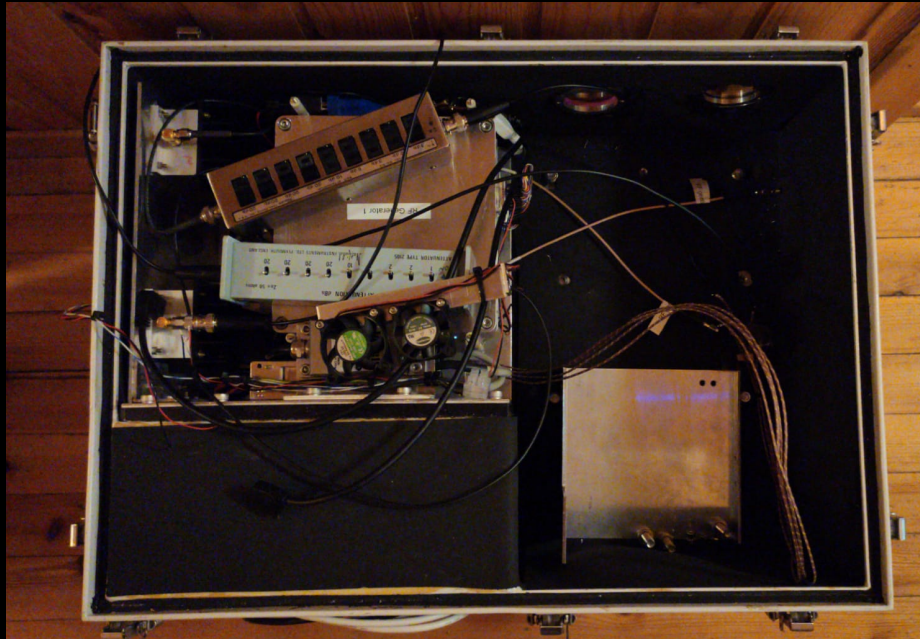


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# ASPA: AOTF-based Spectro-Polarimeter for Auroras



- ✓  $\text{TeO}_2$  Crystal is the polarising element
- ✓ Appropriate acoustic wave propagated within the crystal selects the spectral lines which is diffracted, with a linear polarisation separation.
- ✓ First field-tests last March: unfortunately, no auroras powerful enough to calibrate the instrument correctly
- ✓ TBC !