

Light Pollution at OHP*

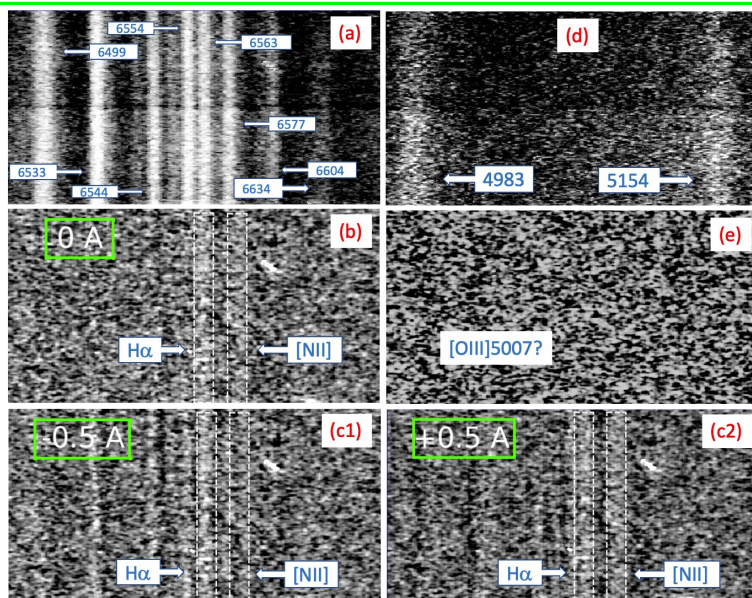
C. Adami, P. Amram, B. Epinat B., and L. Chemin

*Observations done with MISTRAL at Haute-Provence Observatory

CONTEXT: The measurement of the velocity in the Extensive [OIII] Emission Region 1.2° Southeast of M31 was made extremely difficult due to night sky light pollution at the OHP.

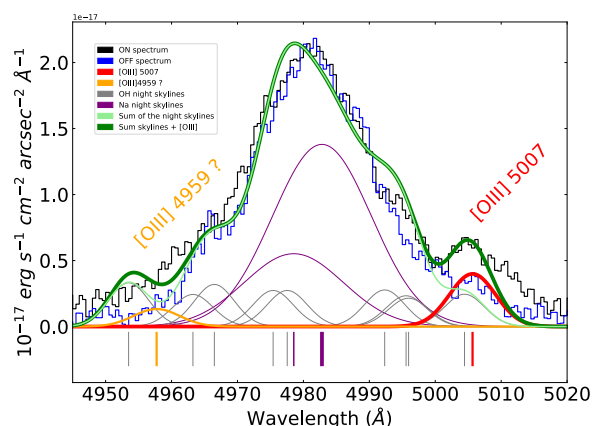
AIMS: We report a first velocity measurement in this extensive [OIII] emission line region.

METHODS: We used the low-resolution spectrograph MISTRAL ($R \sim 750$), a facility of the Haute-Provence Observatory 193 cm telescope. The velocity measurement is based on the $H\alpha$, [NII], [SII] and [OIII] lines.



2D spectra. Panels (a), (b), and (c): Red part of the spectrum around the $H\alpha$ and [NII] 6548 and 6583 lines. Panels (d) and (e): Blue part of the spectrum around [OIII] 5007. Panel (a): Raw spectrum containing the night skylines. Panel (b): Same as panel (a), but the night skylines are subtracted. Panels (c1) and (c2): Position of the sky lines is shifted by -0.5 and $+0.5$ Å with respect to panel (b). The white dotted rectangle in panels (c1) and (c2) shows the position of the $H\alpha$ and [NII] 6583 lines as indicated by panel (b). Panel (d): Raw spectrum showing mainly two sodium night skylines. Panel (e): Same as panel (d). The night skylines are cleanly subtracted, but the [OIII] 5007 line is not visible in the 2D spectra.

1D spectrum around the [OIII]4959, 5007 lines. It is heavily polluted by urban lighting using sodium lamps. Gaussian functions mimicking the UVES OH (in grey) and Na (in purple) night skylines are used to reproduce the sky emission of the offset spectrum (blue stairs). The OH Gaussian line widths are identical and fixed by the LSF at [OIII]. The complex sodium line widths are identical, but free parameters of the fit. These latter line widths are equivalent to those observed by <https://astrojolo.com/wp-content/uploads/2020/01/night-sky-spectrum.png>. The sum of all the night skylines is given by the light green curve. An [OIII] 5007 emission line (red line) is needed to fit the onset spectrum (black stairs), as displayed by the thick dark green curve, which is the sum of the thin light green and red curves. A Gaussian function with an amplitude of one-third of the Gaussian function of [OIII] 5007 is added to simulate the [OIII] 4959 line in order to fill the shift between the onset and offset spectra. Similarly, an $H\beta$ line can be used to fill the same type of broad shift at $H\beta$ between the on- and offset spectra (not shown). The wavelengths of different lines are indicated by vertical lines below the spectrum, using the same colour code.



CONCLUSIONS: Despite the efforts that have been made by several municipalities and individual people around Saint-Michel-l'Observatoire, light pollution remains very high. In these times when we are trying to fight against all forms of pollution, light and electromagnetic pollution in general (including radio emission) remain a major problem for astronomy which is getting worse with the deployment of myriads of telecommunication satellites of all kinds.

Switch off the light !