DETECTION OF THE H-ALPHA AND H2O+ EMISSION LINES IN SPECTRA OF COMET C/2025 R3 (PANSTARRS)

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All spectra collected at Asiago Astroph. Obs. were reduced using standard IRAF procedures, including bias subtraction, flat-field correction, wavelength calibration with HeFeAr lamps, and division by the same solar-analogue star, HD 191854. The individual spectra obtained in each observing session were median-combined to increase the signal-to-noise ratio.

FIGURE CAPTIONS

Figure 1

Three spectra of comet C/2025 R3 obtained on different days at the Galileo telescope (UniPD, Asiago Astroph. Obs., Italy) have been normalized and superimposed for a better interpretation of the variations in molecular emissivity.

Figure 2

The emission region between 5600 and 7000 A is shown shifted with offsets in different colors for March 28 (light blue), March 31 (orange), April 7 (green).

Figure 3

The highlighted region corresponds to the wavelength of the H-alpha emission line. The colors correspond to those in Figure 2.

Figure 4

The region between 6130 Å and 6230 Å of the spectrum taken on March 31 is drawn in blue. Here, it is superimposed on the Liège identification tool (purple), which has been set to indicate the lines due to emission from H_2O^+. Many of the observed lines in the spectrum correspond directly to their theoretical positions, making the identification unambiguous.

Figure 1

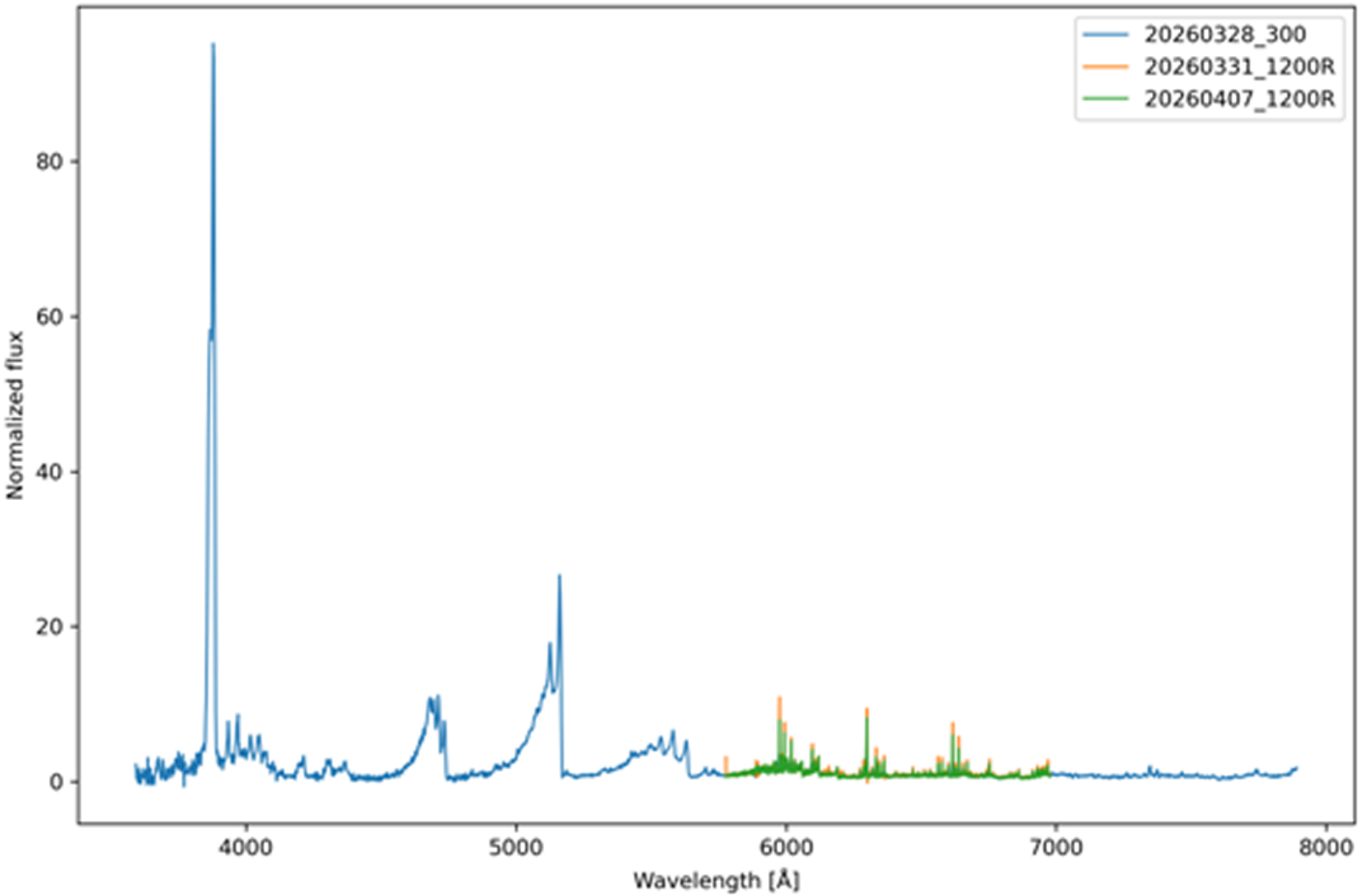

20260328_300
20260331_1200R
20260407_1200R
Normalized flux
0
20
40
60
80
4000
5000
6000
7000
8000
Wavelength [Å]

Figure 2

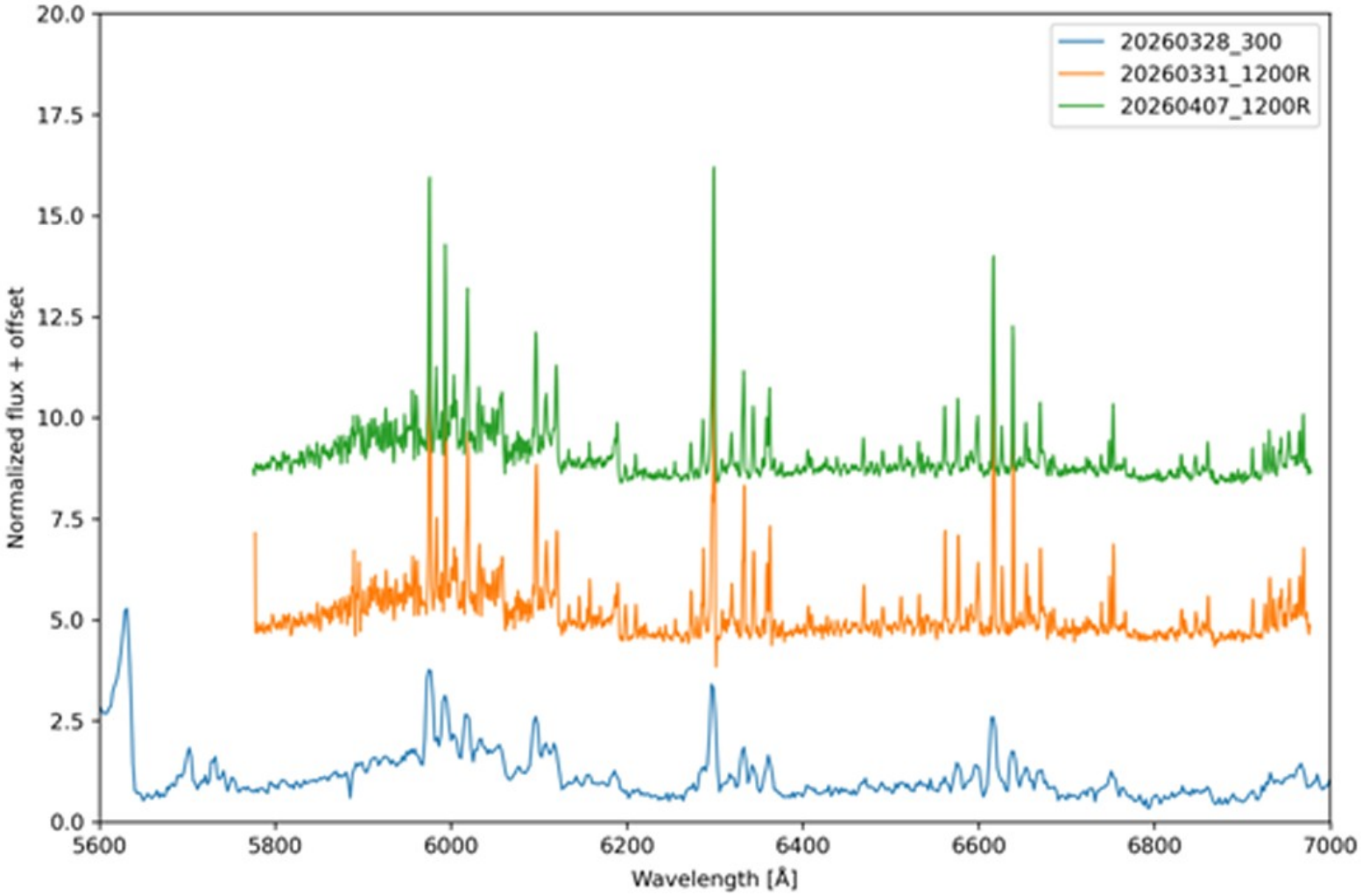

20260328_300
20260331_1200R
20260407_1200R
Normalized flux + offset
Wavelength [Å]
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
5600
5800
6000
6200
6400
6600
6800
7000

Figure 3

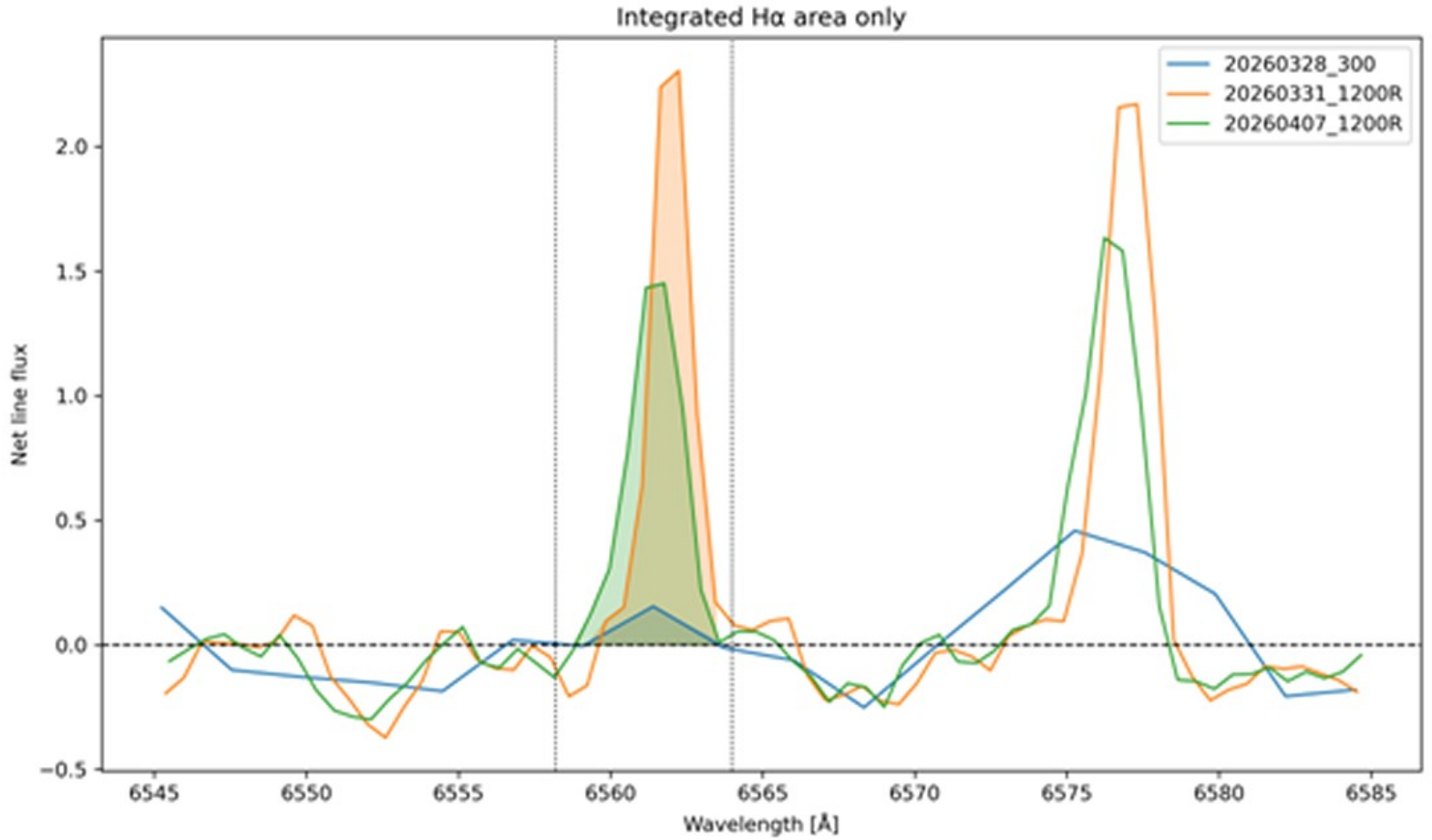
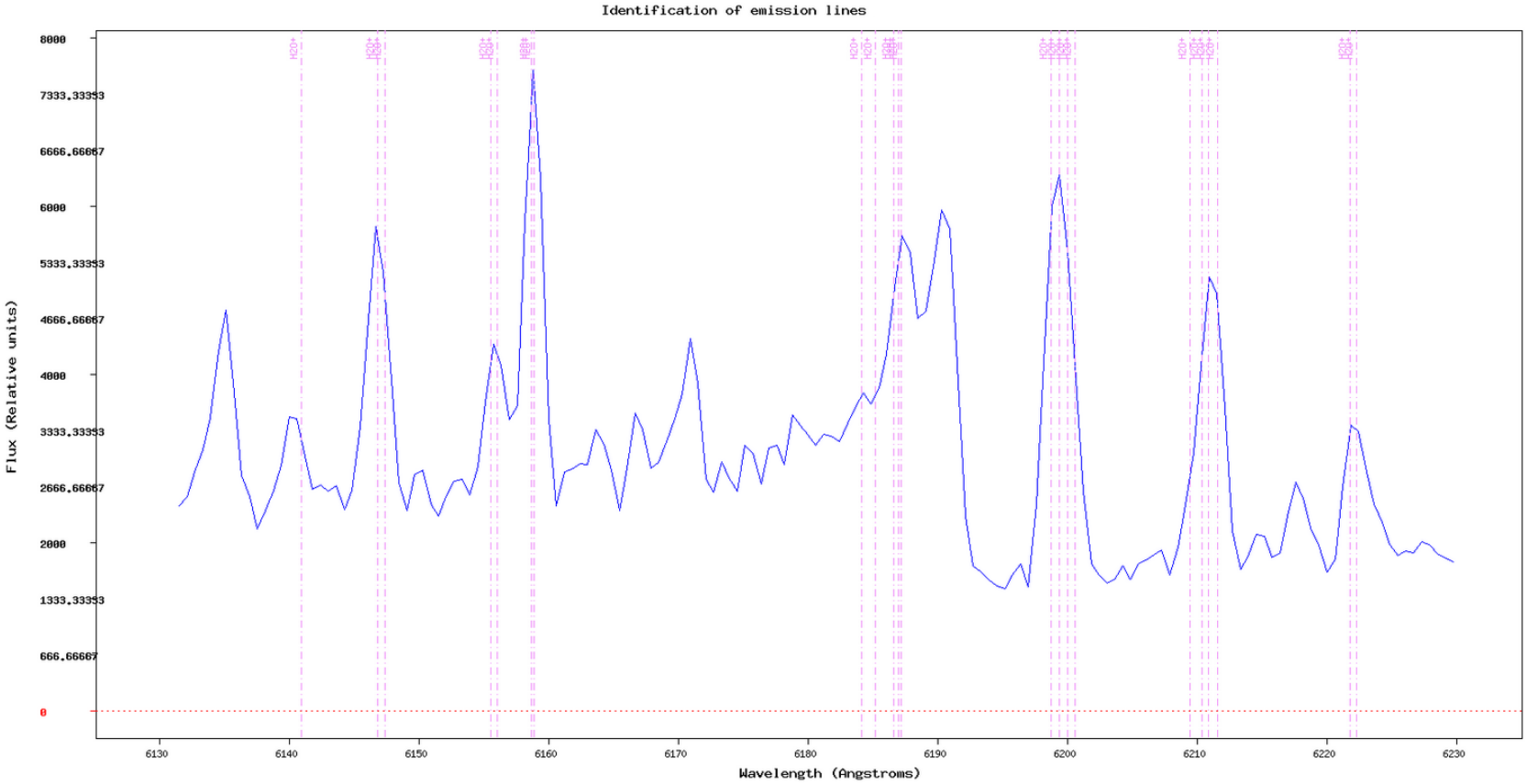

Integrated Hα area only
20260328_300
20260331_1200R
20260407_1200R
Net line flux
2.0
1.5
1.0
0.5
0.0
−0.5
6545
6550
6555
6560
6565
6570
6575
6580
6585
Wavelength [Å]

Figure 4


Identification of emission lines
Flux (Relative units)
8000
7333.33353
6666.66667
6000
5333.33353
4666.66667
4000
3333.33353
2666.66667
2000
1333.33353
666.66667
0
6130
6140
6150
6160
6170
6180
6190
6200
6210
6220
6230
Wavelength (Angstroms)