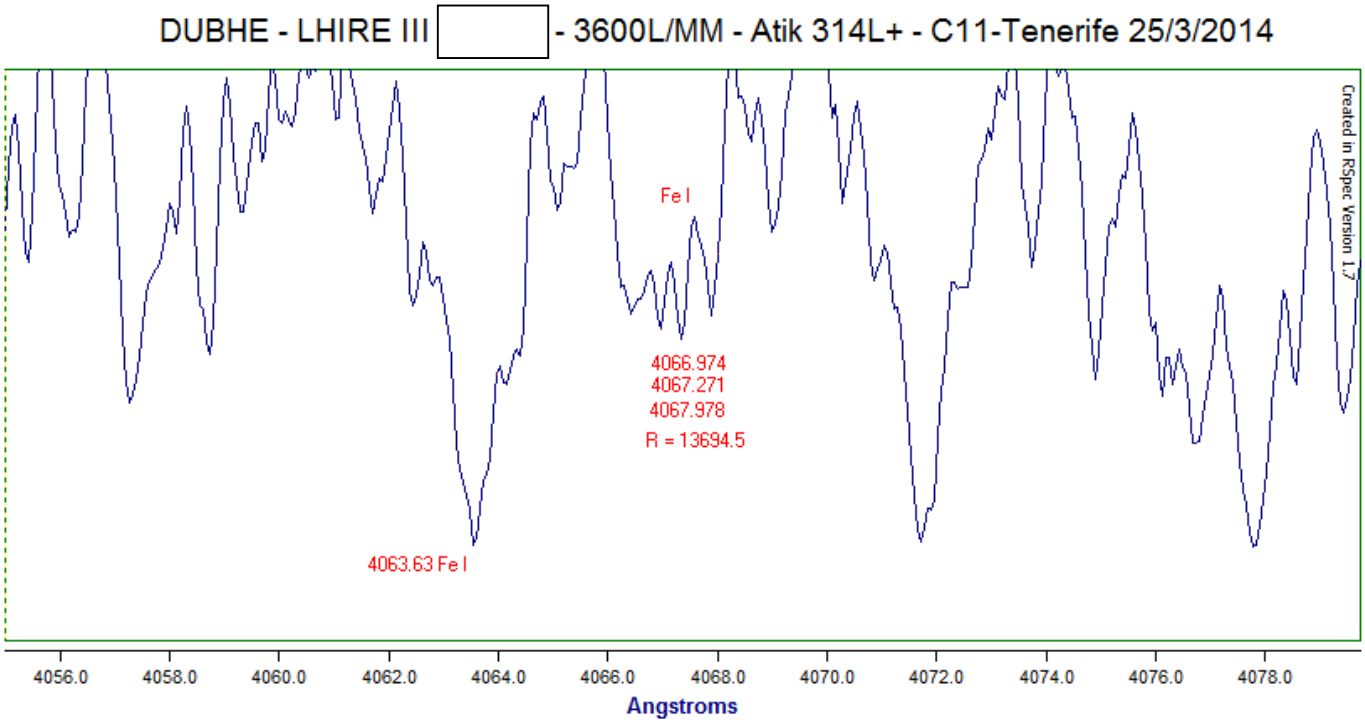
PRELIMINARY RESOLUTION STUDY SPECTROGRAPH LHIRE III WITH HOLOGRAPHIC 3600L/MM GATRING(SECCHI3600)



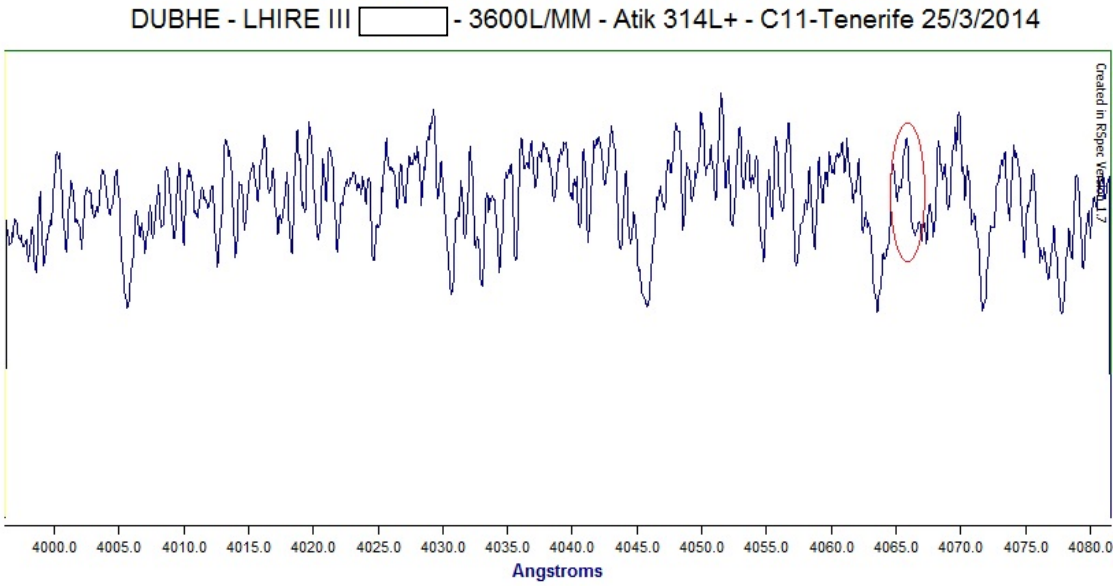
We proceed to the data reduction Taken on the night of March 25, 2014 from the Astronomical Observatory Tejina "Father Lemaitre." We conducted an initial calibration with argon lamp micrometer 1_75.

This first approach has allowed us to clearly identify some of the lines of Fe by Procyon spectrum provided by the Spectroweb (R = 80000) project.

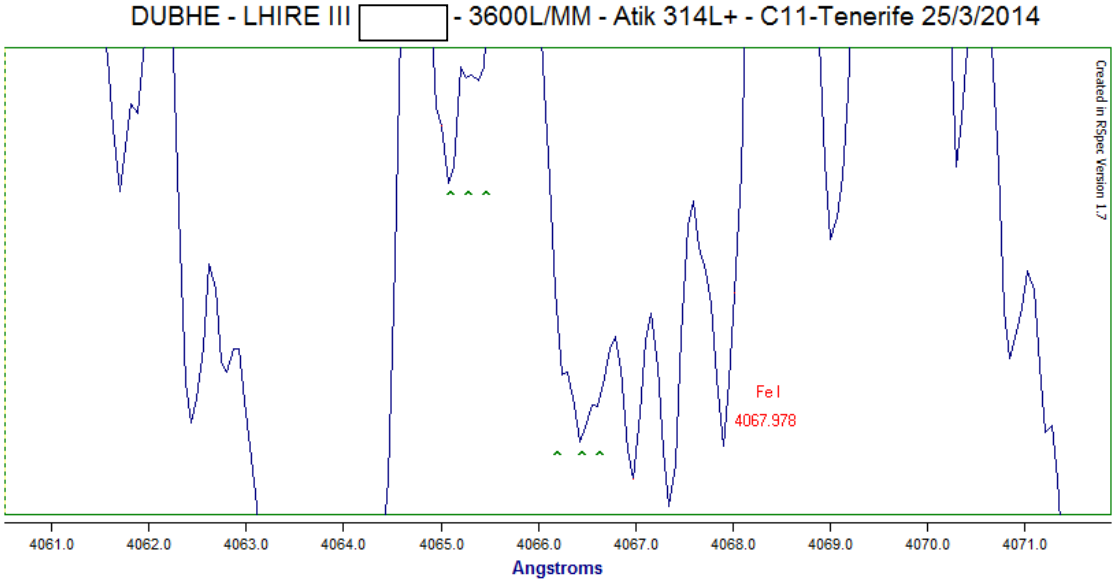
Later calibration with two lines steeper Fe has resulted in a calibration very precise and highly linear, which allows us to work with 0.00X Armstrong. Grid used is 25 microns, so that the resolution could be improved grid.

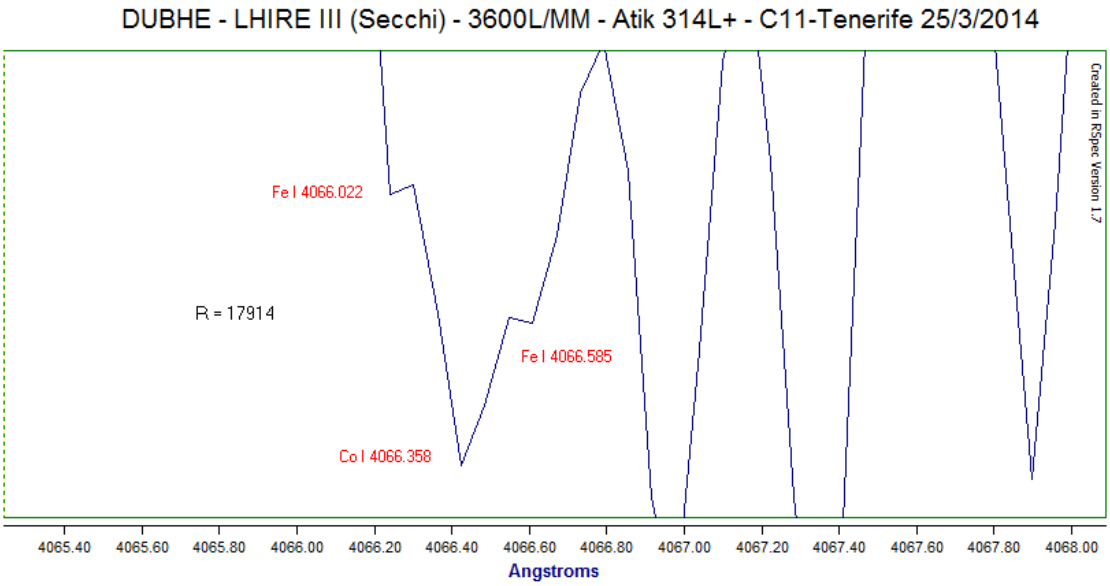
In a first reduction of the lower triplet Fe in 4066-4067 we find an R>13650 stating a clear and accurate differentiation of lines in a smaller range of 0.3 A.

We look at the area between 4065 and 4066.6.

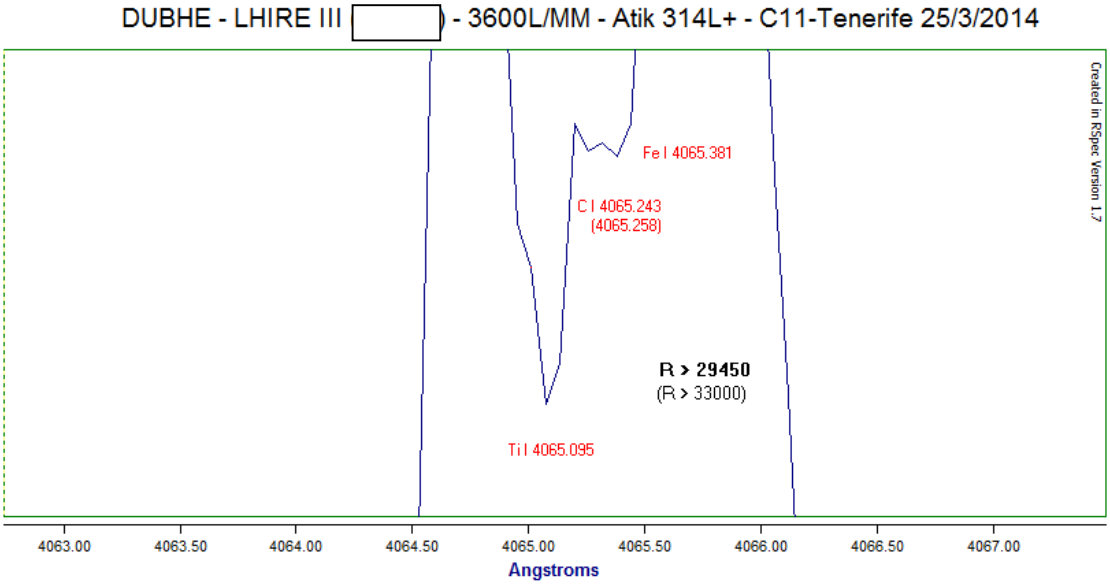


In this area, just before the small triplet, we find two strong lines and four weak lines, two closely spaced to the right of the first box and two more, one at each side of the latter.

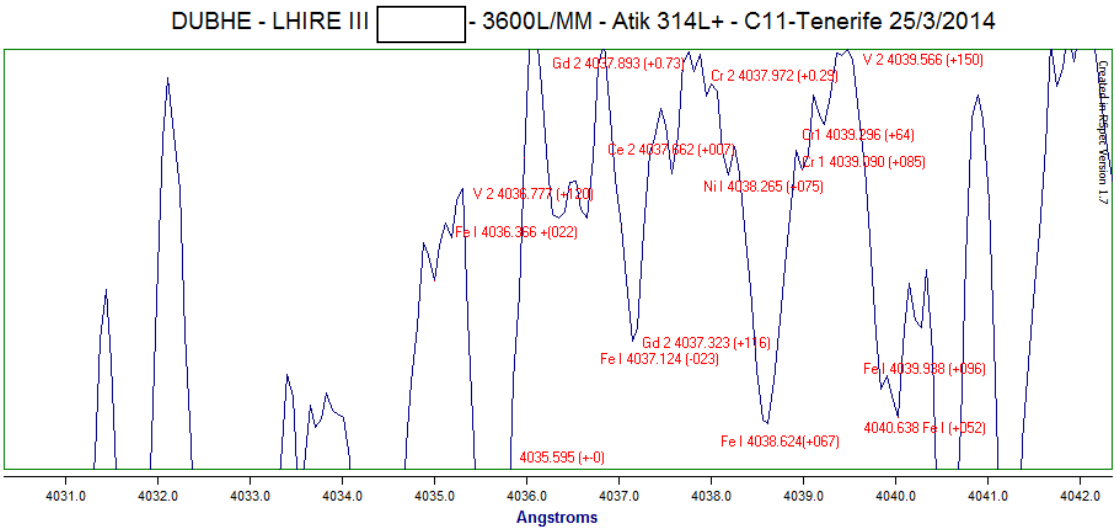


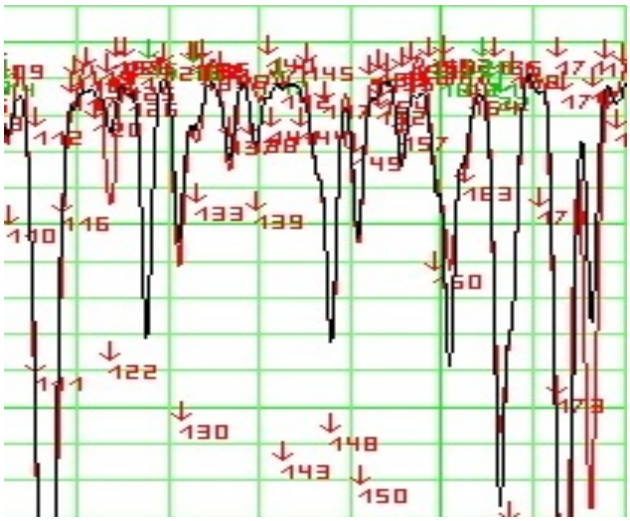


We differentiate the first group closest to recognizing triplet lines Fe I, Co I and Fe I, us whose differentiation result R> 17900.



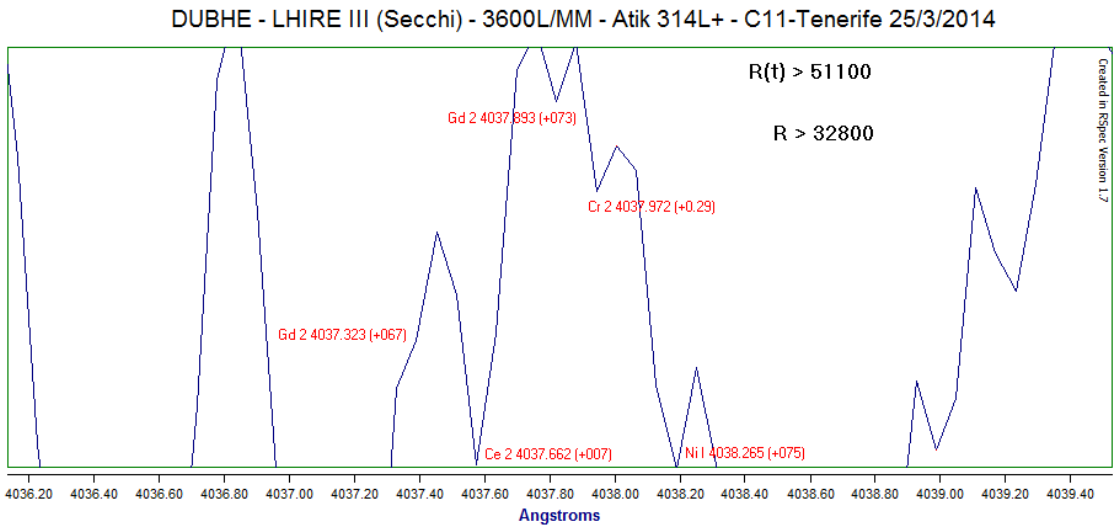
In this second group of 3 lines we find that the Fe I line calibration agrees to the thousandth of Armstrong with reference Spectroweb. Not so with the line C I in which we find a difference of 0.015 ª R varies significantly obtained. Although Δλ = 0.123 A is repeated in 4037,820 in 4050,463 A; Δλ = 0.122 in 4056,174.





Spectroweb detail

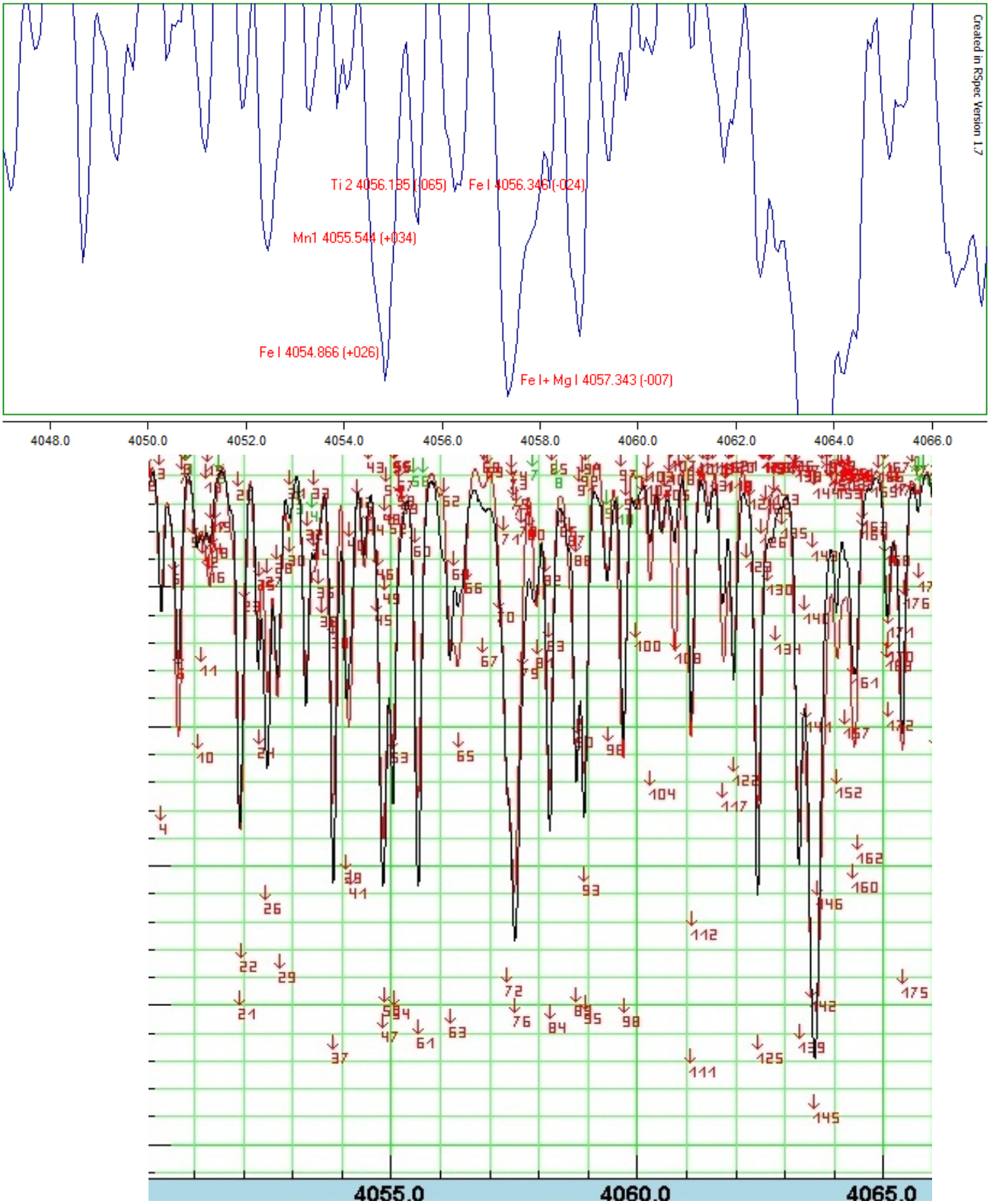
* 4037.820 A In the area of 4037.820 A lines recognize Top with an average accuracy of 0.040 A. We focus on the resolution of the line 4037.820 A



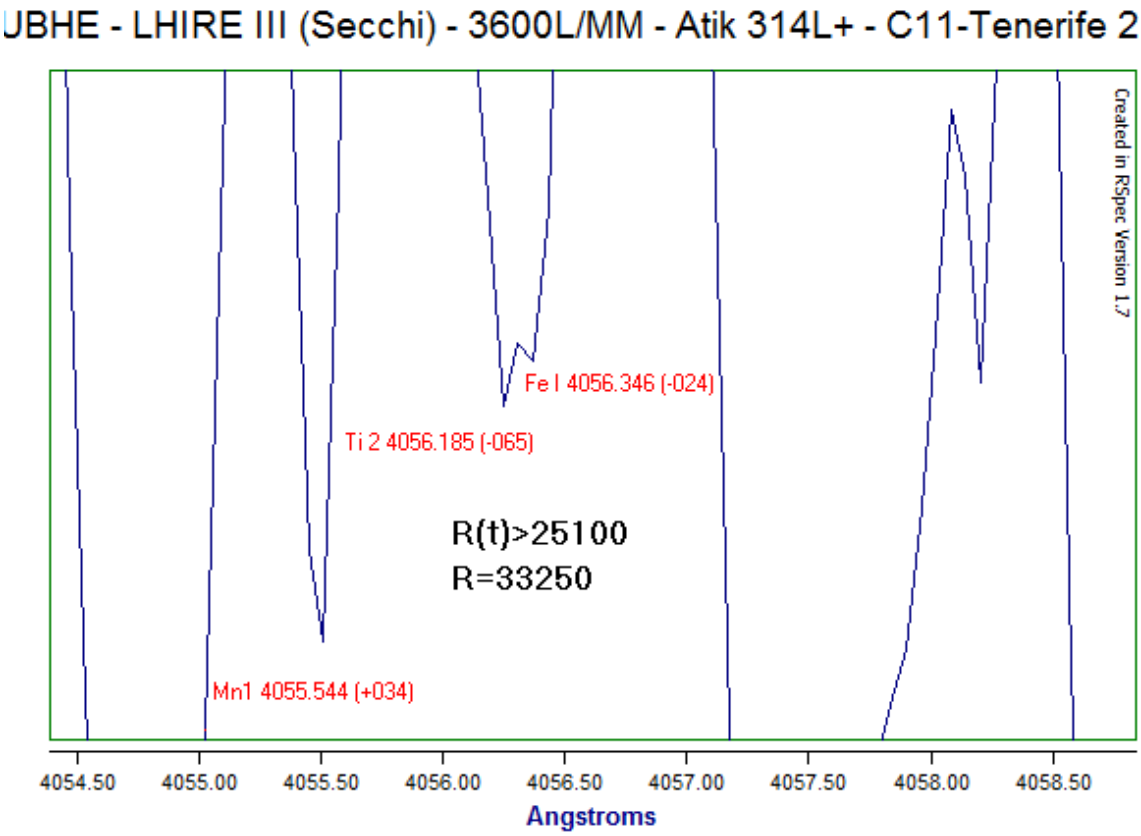
The theoretical resolution according to the wavelength of the identified lines would give us R> 51100, but considering the effective dispersion Δλ = 0.123 → R> 32800.

We will now address the aforementioned area where Δλ = 0.122 Å in 4056,174.

DUBHE - LHIRE III (Secchi) - 3600L/MM - Atik 314L+ - C11-Tenerife 25/3/2014



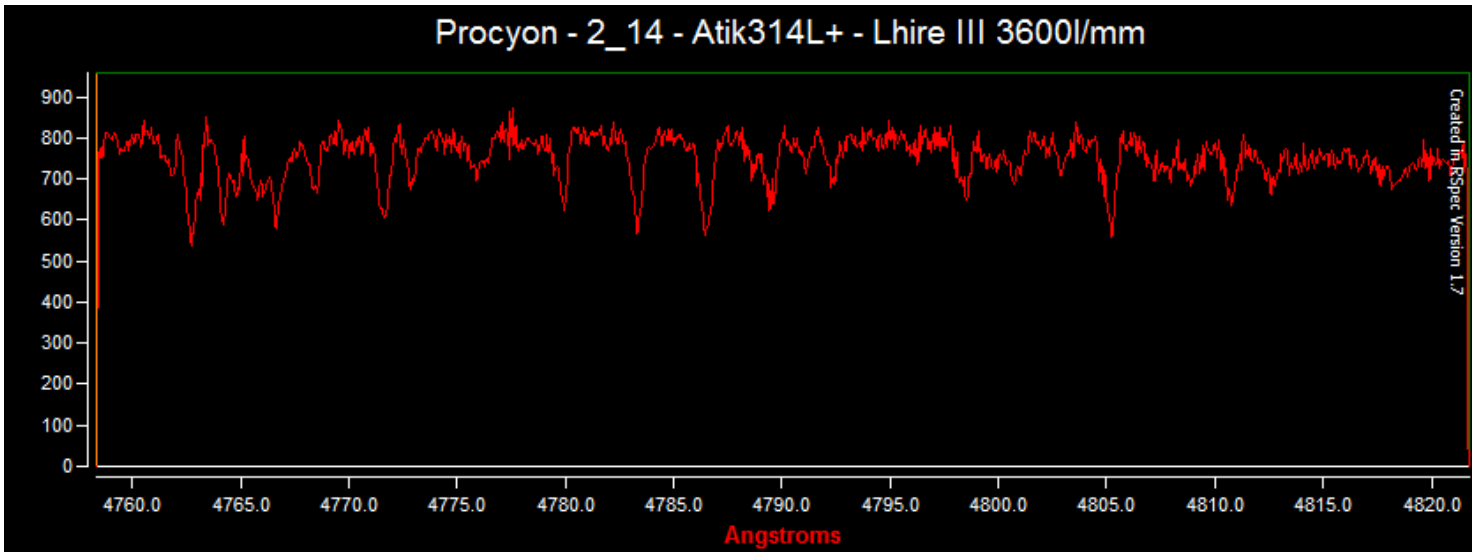
Impressive to see how the visual resolution is very similar to that obtained in the spectroweb project gets R = 80000!



The theoretical resolution in this case is greater than 25100 (in response to the wavelength of identified lines), and 33250 in response to the given wavelength for calibration.

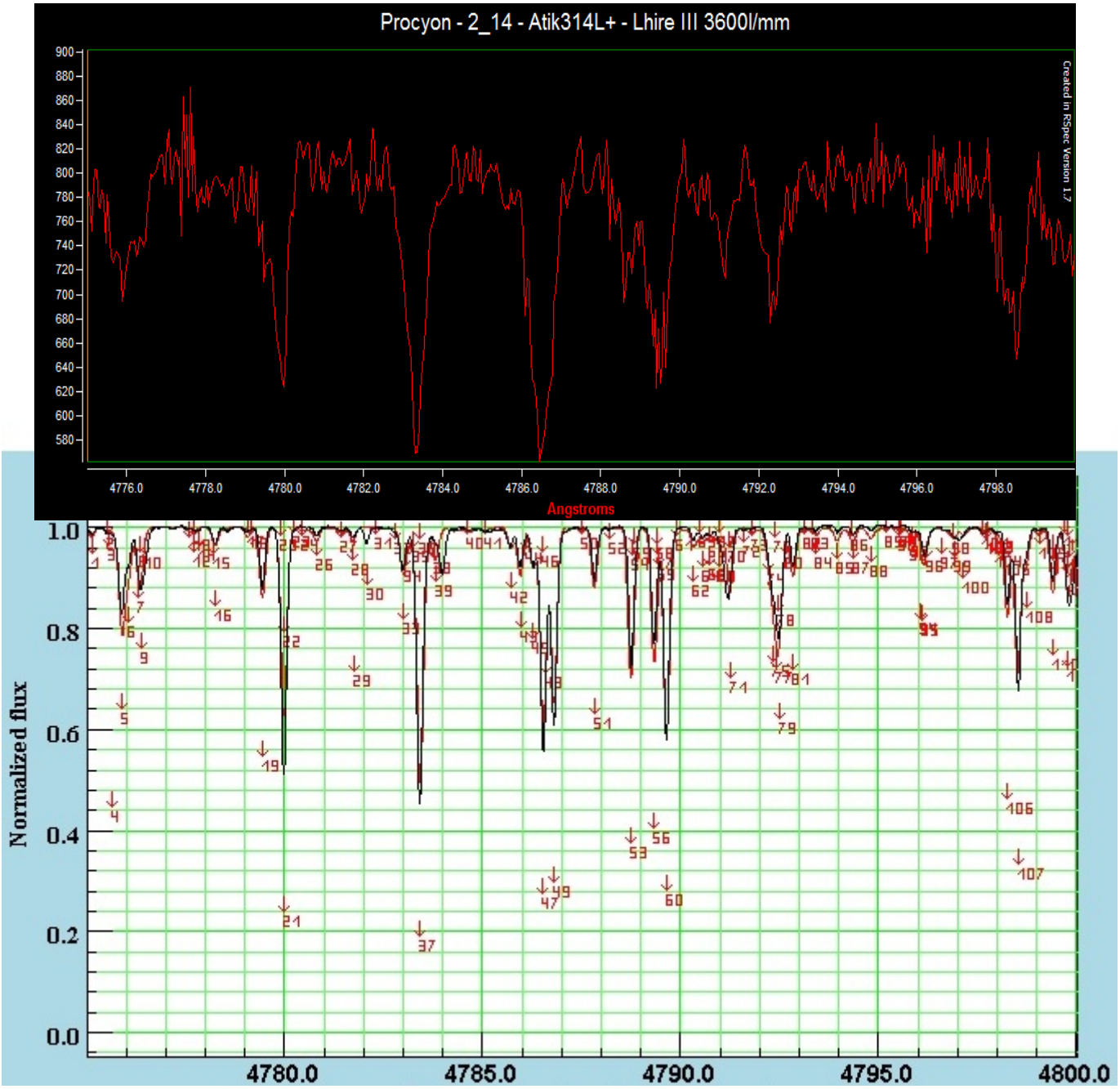
In any case, we found that both the basis of the calibration, conditioned by the dispersion graph our reduction, as a theoretical wave length lines identified, the resolution of our spectrograph renamed SECCHI exceeds R = 33000

CHECKING CALIBRATION SPECTROWEB



The calibrated spectrum of Procyon with two of the deepest lines. The shot is 30s. to C11 through the tube. The spectral amplitude of the decision is to 4821.740 4758.400 Å Å ($\lambda_2 - \lambda_1$ = 63.34 Å). The number of effective pixels = 1391; Dispersion = 0.0455 Å / pix.

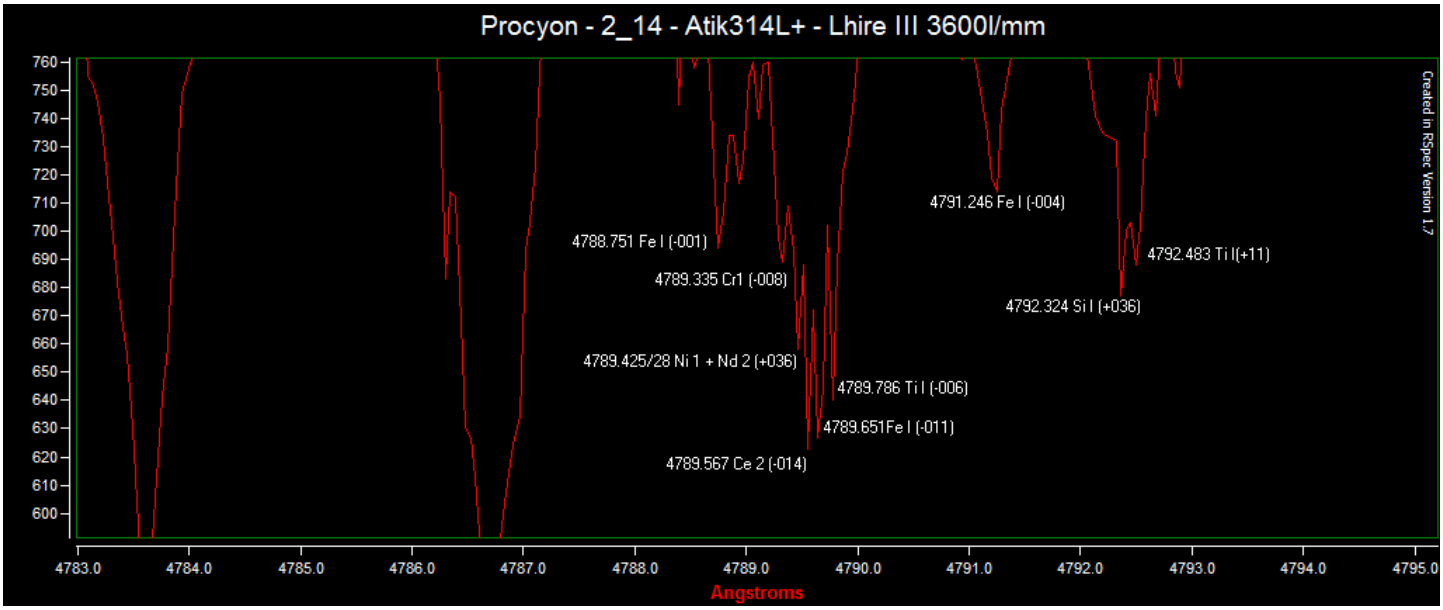
Let us now contrast the area of 4775 Å to 4800 Å with the same spectrum of Procyon taken from Spectroweb (R = 80000) project.



The main lines match perfectly. Keep in mind that many of the minor lines (marked with numbers) in Spectroweb not highlighted when giving the flow spectral normalization.

The decision made by the Lhire III (SECCHI3600) and the grating is in 3600l/mm maximum extent possible to the red (a future modification might allow us to reach maximum possibilities of the grid <5400 Å>).

This is where we will check the maximum resolution of our spectrograph SECCHI3600 renamed.



The wavelength corresponding to the indicated data Spectroweb (are completed elements of some lines with data from other stars). For each line marked precision calibration Rspec indicated.

That is, by eg Fe I 4788.751 Å line appears in our theoretical calibration (real) with 0.001 Å less, (4788.750) In this way and according to the formula R = λ / Δλ get: R (Δ theoretical in Ne2 Fe I) = 4789,651 / (4789.651-4789.567) = 57019.65 = R (t)

But if we take the actual resolution of our calibration we find that: R (real in Ce 2 Fe Δ I = 4789,642 / (4789.642-4789.553) = 53816.20 = R (r)

R> 53800!!

If we look at the first calibration performed over the entire spectral range obtained in making (reusing a finer recalibration in the study area), we obtain:

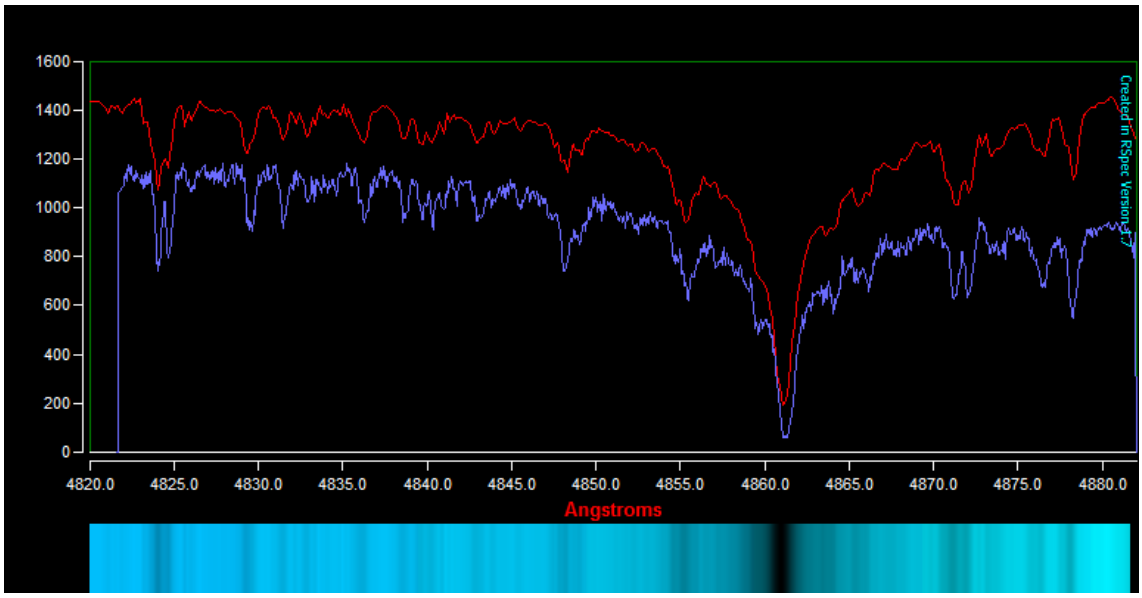
R = 4789.503 / (4789.503-4789.412) = 52631.9 = R

R> 52600!

Even staying with the lowest score, since some lines are truly difficult to identify, it is clear that the result is magnificent and unexpected, even when the resolution is given to us at 4800 Å, what awaits us if got to the 5400A? And with 15 micron grid?

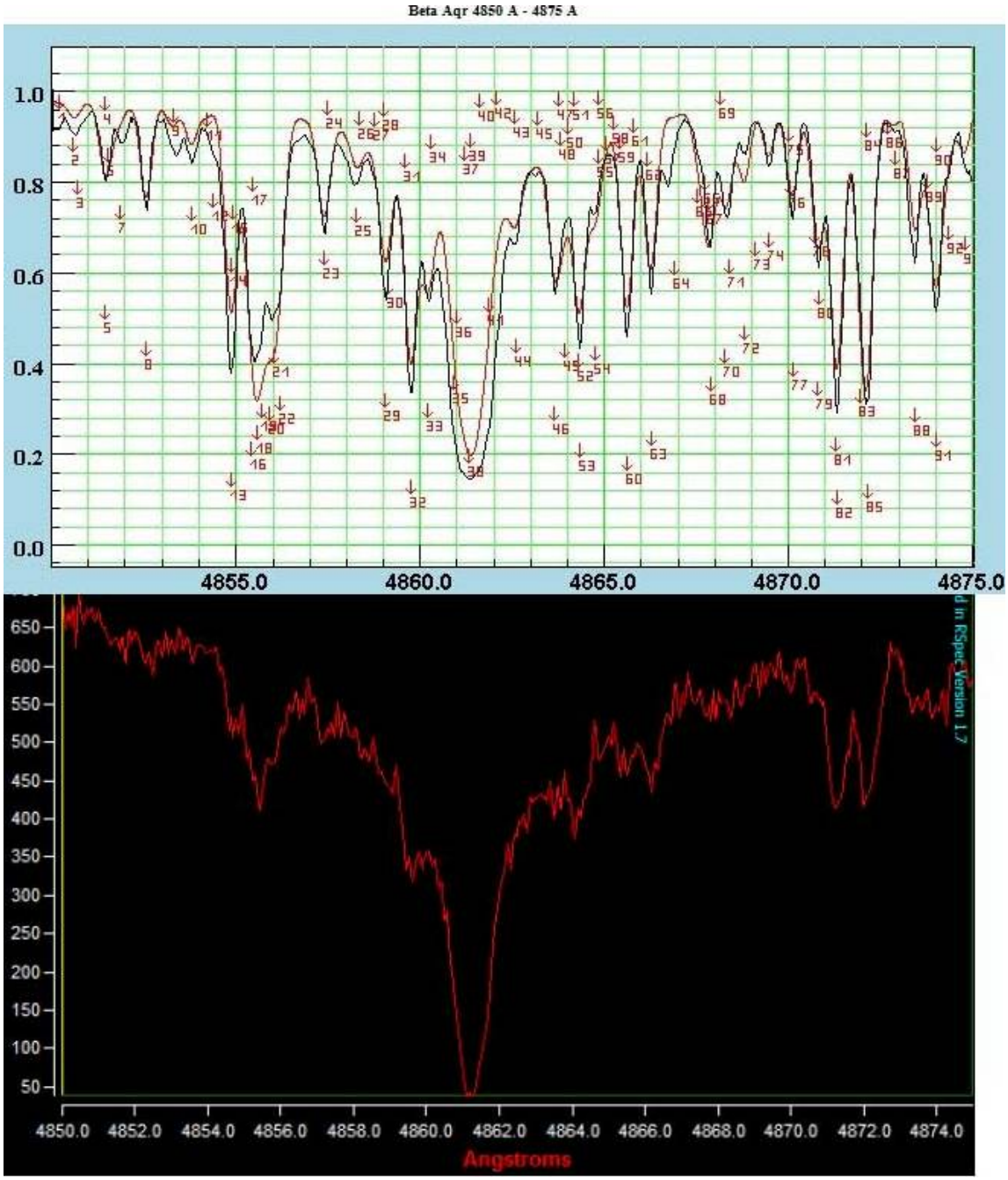
Comparison grid resolution of 2400 l / mm grating and 3600 l / mm

The spectrum at 2400 l / mm (red) and 3600 l / mm (blue) correspond to the star Procyon.



In this last shot we have obtained a Half Δλ = 0.087 in 4863, which would indicate a R = 55896. Another Comparison Chart with Spectroweb shows

how close the two effective resolutions



As shown in the image, we could state that relatively (assuming we could reach 6500-7000 ª) the maximum R of our spectrograph would greater than the maximum Spectroweb R (R = 80000).

After these first impressions, we have to recalibrate the Lhire III get a better focus, increase range and a more precise study chemical studies of repeated calibrations and detail. Regards and clear skies