

Questions

Technical issues:

While having a reasonable well balanced image open in Photoshop, answer these questions:

Loosing information

In image analysis people often talk about the problem of losing information during the process of image analysis.

- Experiment! Do not save the image during the following experiments as they might greatly reduce the quality of the image.
- Try to open the levels correction layer for all the original layers one by one. When having them open, set the black and white sliders close to each other.

Now you will get an extreme example of an image where too much information has been removed while truncating the histogram.

- Do not save this image – revert to the pretty one you started out with, either by choosing “revert” under the file menu or by picking the appropriate step in the history window.

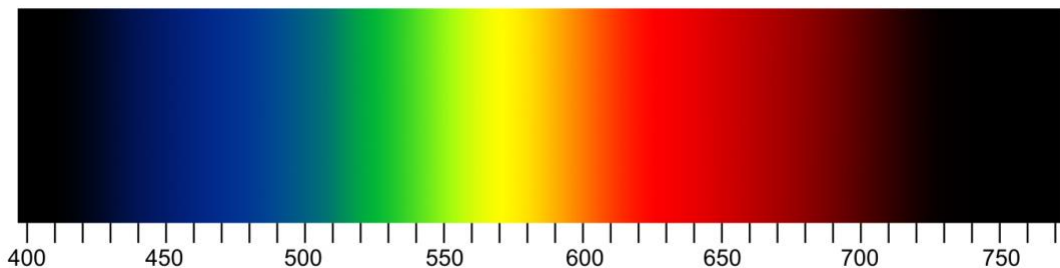
Colour blending in the additive colour mixing mode

- Try to look at the coloured layers one by one to get an impression of how they look. This can be done by making the other layers invisible, simply by clicking on the eye to the left of the layer in the layer window. Then try to view the red and green layer together alone.
- What colour do you get from mixing red and green?
- Try the same with the other two possible combinations. What is the result of mixing red and blue?
- What is the result of mixing blue and green?

Assigning “natural” colors to the different exposures:

- Try changing the hue of one or more of the layers, to get them to more closely represent the colour that corresponds to the wavelength where the filters that were used have their maximum.

You can use this figure showing the relationship between colour and wavelength for the conversion.



- Did the quality of your image improve? Why / why not?

Discussion subjects:

Imagine that you are the author of an "International charter of proper behaviour for astronomical image analysis". Which rules would you put in?

- Is it reasonable to assign for instance a red colour to an infrared exposure and a deep purple to an ultraviolet exposure?
- Is it reasonable to assign a totally different colour like for instance bright green to say the 631 oxygen line, just for purely aesthetic or artistic reasons?
- When an image is composed of partly two different exposures made in narrow band filters at 656 nm (H-Alpha) and at 658 nm (NII - nitrogen), it is more than tempting to assign radically different colours to the two different exposures, simply to be able to distinguish between the two different elements and their location in say a planetary nebula.
However, if one has a strict approach to image processing, the goal is to produce an image that approximates the sight a future space traveller will see when approaching the object from afar – and the human eye is a good detector, but a two nanometer wavelength difference is not enough for the human eye to distinguish between nitrogen and oxygen.
How much is it reasonable to let the hues differ of two exposures taken of almost the same wavelength?
- Is there any reason to produce pretty looking images without describing the physical processes that produces the radiation?
Is it possible to enjoy an image showing a nebulous envelope of hydrogen seen in an exposure in the wavelength corresponding to the H-alpha line without knowing anything about atomic transitions ...?
- What would you do with a dataset consisting of three different infrared exposures at say 814 nm, 1000 nm and 1200 nm?