The Use of False Color to Enhance Images from the Hubble Space Telescope

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Abstract. From the Hubble Space Telescope's data archive, images were selected from different camera angles of Supernova 1987A. With these images, the program DS9 was used to convert the images from FITS to JPG, and Photoshop CS3, to combine the images, making a false color picture of the supernova.
Keywords: astronomy, false color image, Hubble space telescope, supernova 1987A

INTRODUCTION

The Hubble Space Telescope produces so much data that astronomers are unable to analyze all of it. This situation creates opportunities for amateur contributions. Typical targets are imaged by the Hubble with multiple instruments, or at multiple angles, or filtered for various wavelength bands. Some of the wavelengths are beyond human eyesight, and are remapped to the visual wavelength spectrum. More generally, different images of the same target can be assigned to different color bands, such as red, green, and blue. They were all combined to make false color images. The false color approach was used in this study. A well known object, Supernova 1987A, was selected for processing.

METHODS

Three images of the Supernova 1987A, which were taken from different angle cameras, were downloaded from the Hubble Space Telescope Archive [1]. The DS9 software package was then used to convert the images from FITS to JPG. Then, Photoshop CS3 was used to convert the images into red, blue, and green images using the opacity and color balance controls. The three images were then put together as layers on top of a black layer which resulted in a final false color image of the supernova.

RESULTS

Using the opacity and color balances in the Photoshop CS3 program, the three images, downloaded from the archive, were converted in green, blue, and red images. By combining the 3 images on top of a black layer, I was able to make a final color image of the supernova.

DISCUSSION

The most interesting features of the experiment were the results of the combined images of the Supernova 1987A. The limitations and uncertainties of the results is that my results weren't similar from professional images from astronomers because false color was used instead of infrared, X-ray and visible light used by professional astronomers. By using my method of false color, anyone with access to the Hubble Archive can search for images of different objects.

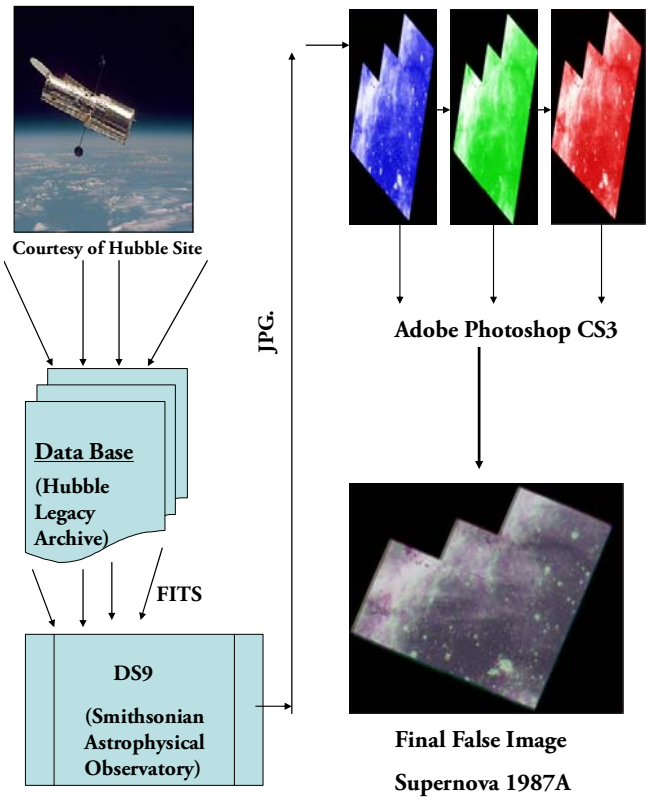

FIGURE 1. Flow chart of the steps to making the final false image of the Supernova 1987A. Includes the source of image (The Hubble Space Telescope), the database and programs used.

CONCLUSIONS

The images taken by the telescope should be analyzed more than just the more important objects near and around us. The Hubble Space Telescope takes many images that are not analyzed by most astronomers. Amateur astronomers should analyze these images that otherwise wouldn't be seen.

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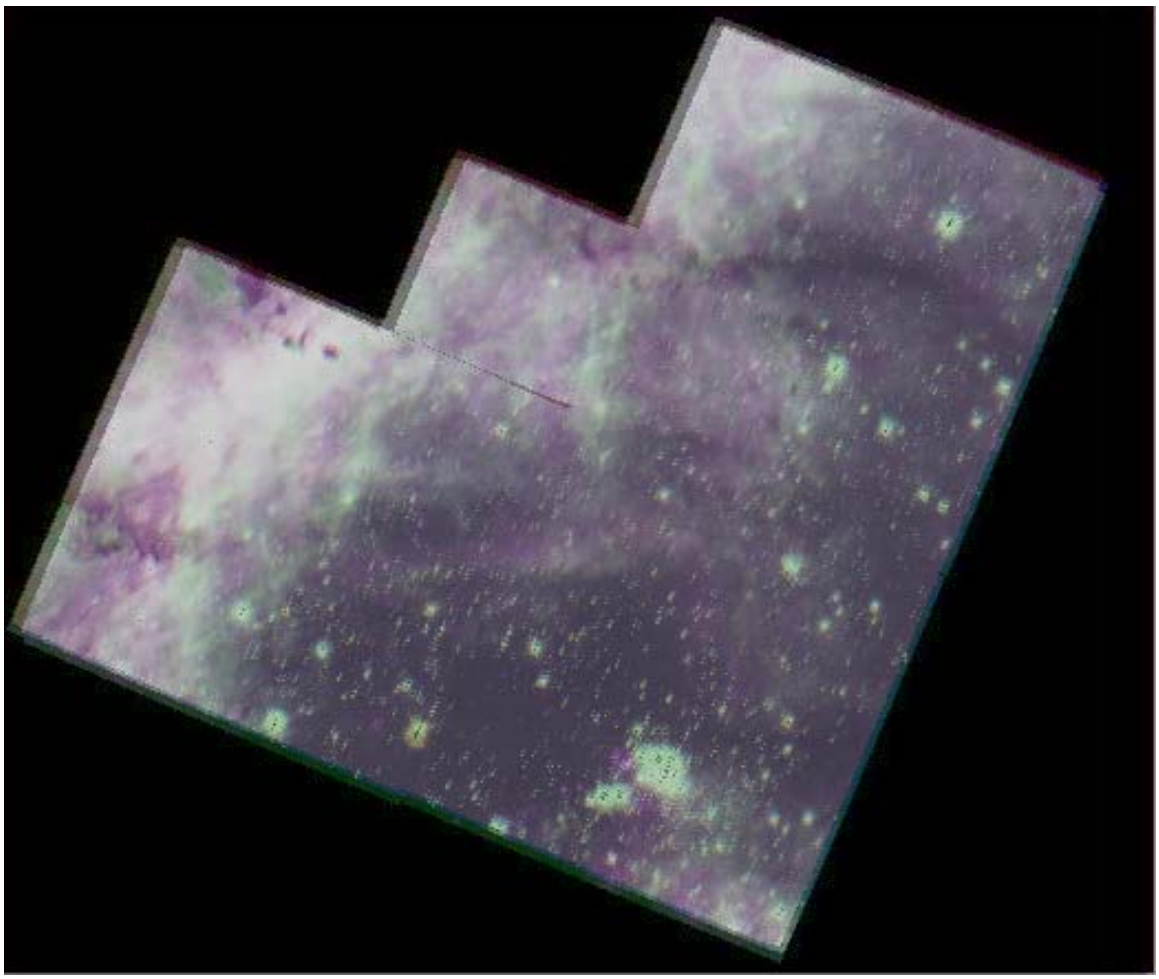

FIGURE 2. Final false color image of the Supernova 1987A

REFERENCES

1. Hubble Legacy Archive Database: http://hla.stsci.edu/hlaview.html#
2. Hubble Site: http://hubblesite.org
3. Space Telescope Science Institute: http://stsci.edu
4. Explanation to the use of colors: http://hubblesite.org/gallery/behind_the_pictures/
5. The Hubble Heritage Project: http://heritage.stsci.edu/