

HOW TO COLOR THE UNIVERSE

Different telescopes observe different kinds of light (most of which are invisible to the human eye, such as X-rays and infrared light). By making images from their data, coloring them thoughtfully, and combining them carefully, we get a more complete picture of our Universe.



When a satellite observes an object in space, its camera records photons. These photons come down to Earth coded as values in the form of 1's and 0's.

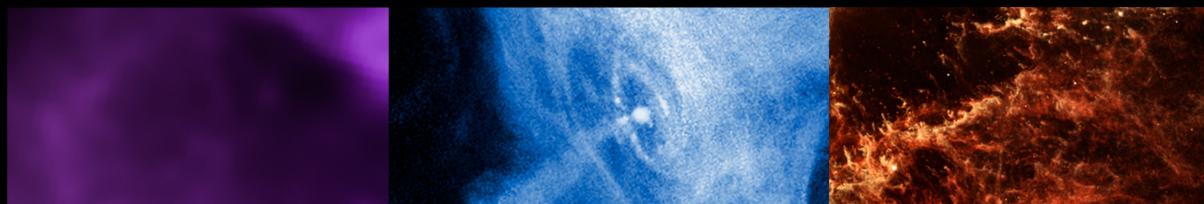
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time      expno  chipx  chipy  pha      energy
s                                     pixel  pixel adu      e
1      4.020389834314345E+08      3      158      40      364
2      4.020389834314345E+08      3      132      41      280
3      4.020389834314345E+08      3      191      43      349
  
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Scientific software then translates that data into a table that contains the time, energy and position of each photon that struck the detector during the observation.



The data are further processed with specialized software to transform the columns and rows of information into a visual representation of the data, that is, an image. The image, at this stage, is in black and white.



Colors play a very important role in communicating information in astronomical images. Sometimes, colors are chosen to illustrate specific bands of light. There can be other motivating factors when picking colors, such as highlighting a particular feature or showcasing particular chemical elements.

The end product is not only visually pleasing, it is also rich with information. This image of the Crab Nebula, the remains of a star that exploded over a thousand years ago, demonstrates the possibilities of seeing our Universe more fully thanks to modern technology.

In this image of the Crab, blue represents the X-ray observations, red and yellow represent the visible, and purple represents the infrared.

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