

## The Sky in New Eyes

### What kind of light do your Eyes see?

Humans have eyes that are sensitive to light in the "visible" portion of the spectrum. The visible portion is where most of the Sun's energy is, and is the portion that most easily gets through our atmosphere. But light energy can also be detected at lower and higher wavelengths (higher and lower energies, respectively).

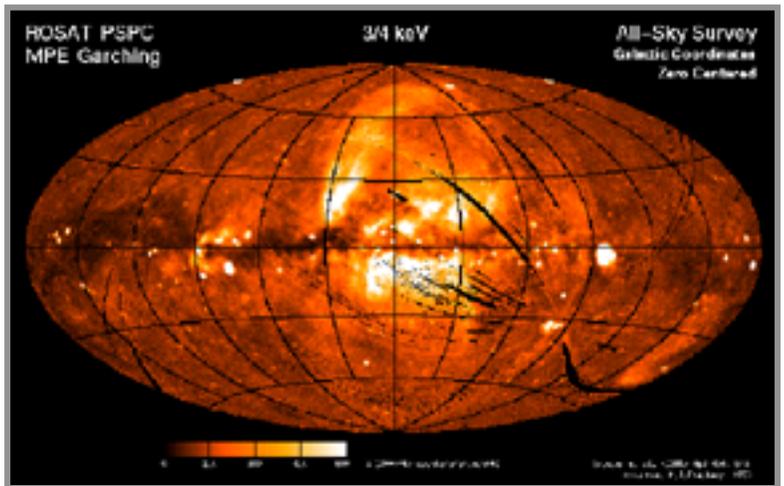
### All Sky Images:

Look at the images in the "All Sky" section of the Astronomy module of Space Update. Each image is oriented so that the center of our Milky Way Galaxy is in the center of the oval, and the plane of the galaxy is horizontal (See the "visible" image at right). You can change the wavelength of light by clicking inside the bar (beneath the words "radio", "visible", etc.) or by using the "next" or "prev" buttons at the top. Step through the images from radio (the lowest energy) to gamma ray (the highest energy). Make a list of the images. Which one(s) have the galaxy clearly apparent, as in the visible light image?



### Understanding the Data:

For some of the images (like the radio image) the center of the galaxy has a significant bulge right in the center of the image. In other wavelengths, the center of the galaxy doesn't have much bulge. Why do you think that could be? In some of the images (like the 0.75 keV X-ray image here), the galaxy has a bulge but there is a dark stripe across the bulge. What do you think causes that? Check your answer by reading the caption (click the "info" button on the top left).



For some of the images (like the Gamma ray bursters), the dots are all over with no sign of a concentration in the direction of the galaxy at all. This could mean either that the sources are very close by and faint (so we only see nearby sources and not ones from the far side of our galaxy), or that they are very, very far away and not part of our galaxy. Since gamma rays have a lot of energy, if the sources are very far away, that makes the gamma ray bursters some of the most energetic objects in the entire universe. Do a web search on "gamma ray bursts" and see whether most scientists think they are local (and not very energetic) or very distant (and very energetic). What other data have been taken that makes the scientists favor one of these two possibilities?