The Bubble Nebula, observed with the new One Degree Imager Camera

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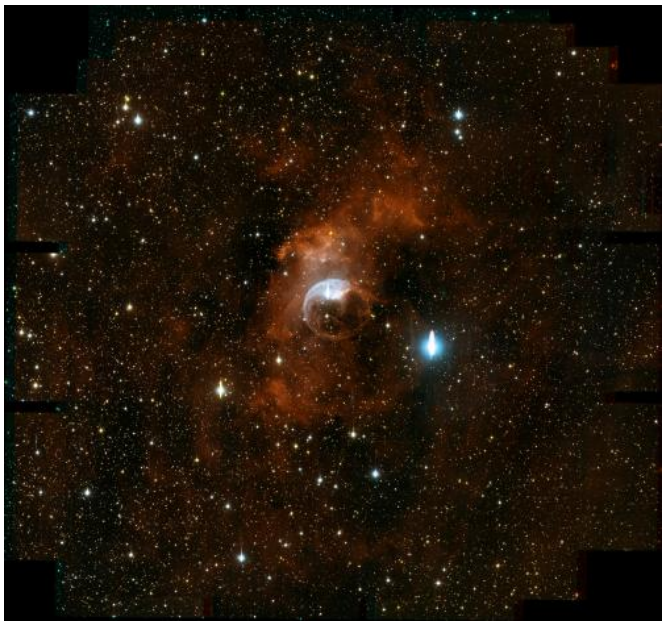

The Bubble Nebula (NGC 7635) captured by the new ODI camera on WIYN. This wide field view, showing the nebulosity carved out by the winds of the massive central star, demonstrates the exquisite image quality. An image of the central portion of the nebula, cosmetically corrected, is found here. Image Credit: T.A. Rector (University of Alaska Anchorage), WIYN ODI team & WIYN/NOAO/AURA/NSF.

(Phys.org)—Just in time for the holidays, a spectacular image of the Bubble Nebula (NGC 7635) demonstrates the potential of the new camera known as the One Degree Imager, or ODI, that is being commissioned at the WIYN 3.5-meter telescope on Kitt Peak. The Bubble Nebula is a shell of gas and dust carved out by the stellar wind of the massive central star (BD+60 2522), and ionized by the same star's high-energy light. Located in the constellation Cassiopeia, this nebula is about 10 light-years across.

The accompanying wide field of the Bubble Nebula covers an area of the sky of 25 by 25 arc minutes, just a little smaller than the full moon. The exquisite resolution, or sharpness, of the stars right to the edge of the image is a hint of things to come.

This image of the Bubble Nebula was created using three different filters (referred to as g, r and i) which are then assigned to the colors blue, red and yellow, respectively. The wide field color image has not been fully corrected to remove all defects and artifacts from the data reduction process, but the accompanying smaller image showing the heart of the nebula is in a final form. Color combining of astronomical images is an art as well as a science: the work on this image was done by Dr. Travis Rector, who explained, "When making an image in effect we are translating what the telescope can see into something our eyes can see. In the process of generating an image we assign different colors to each filter that we use. Where possible we assign colors to each filter that roughly correspond to what the human eye would see." More information on how these images are created is available here.

Even prior to color combining, the data reduction process is a very complex multistage operation: the data from ODI are first processed by the Science Data Management group at the National Optical Astronomy Observatory (NOAO), then moved and archived at Indiana University's Pervasive Technology Institute, utilizing an NSF supercomputing facility. Among the issues that must be addressed is simply the sheer number of pixels in the multiple CCDs. Currently, the camera is only operating with 13 of its eventual 64 CCDs. When fully operational, the ODI camera will be able to image an area of the sky five times that of the full moon—far larger than any previous camera at the WIYN telescope. Sensitive to visible light, the camera will be able to resolve objects to better than 0.4 arc seconds.

More details about the ODI camera are available

here.

Provided by National Optical Astronomy Observatory