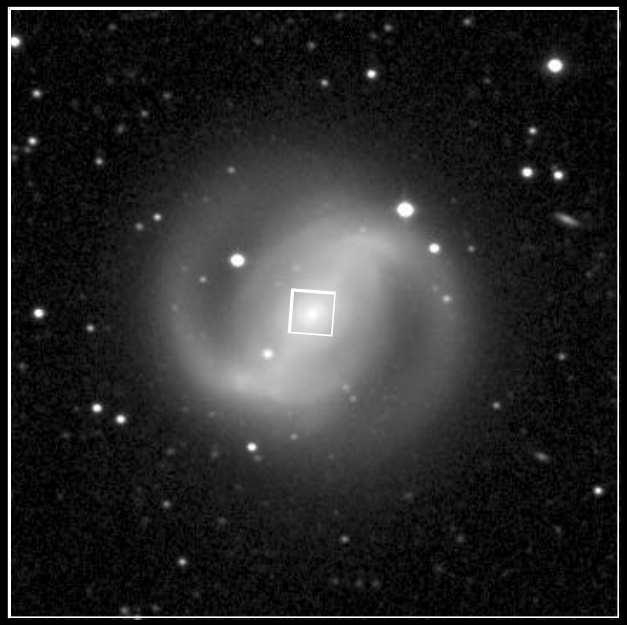
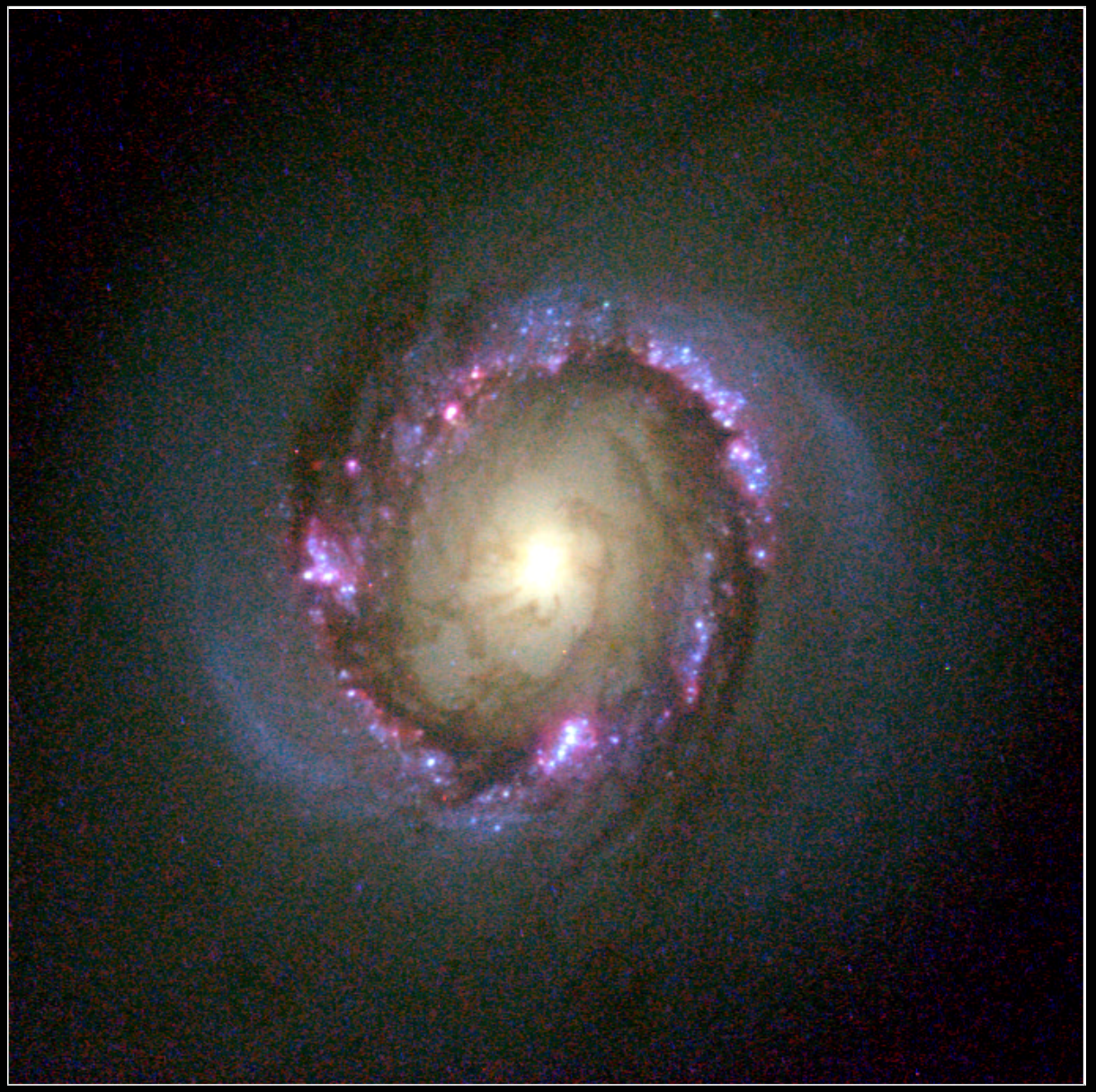


McDonald Observatory



HST

Galaxy NGC 4314 • Nuclear-Ring
Hubble Space Telescope • Wide Field Planetary Camera 2

PRC98-21• June11,1998 • ST ScIOPO • G. F. Benedict (UniversityofTexas) andNASA

Hubble Space Telescope
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A BRIGHT RING OF STAR BIRTH AROUND A GALAXY'S CORE

An image from NASA's Hubble Space Telescope reveals clusters of infant stars that formed in a ring around the core of the barred-spiral galaxy NGC 4314. This stellar nursery, whose inhabitants were created within the past 5 million years, is the only place in the entire galaxy where new stars are being born. The Hubble image is being presented today (June 11) at the American Astronomical Society meeting in San Diego, Calif.

This close-up view by Hubble also shows other interesting details in the galaxy's core: dust lanes, a smaller bar of stars, dust and gas embedded in the stellar ring, and an extra pair of spiral arms packed with young stars. These details make the center resemble a miniature version of a spiral galaxy. While it is not unusual to have dust lanes and rings of gas in the centers of galaxies, it is uncommon to have spiral arms full of young stars in the cores. NGC 4314 is one of the nearest (only 40 million light-years away in the constellation Coma Berenices) examples of a galaxy with a ring of infant stars close to the core. This stellar ring – whose radius is 1,000 light-years –- is a great laboratory to study star formation in galaxies.

The left-hand image, taken in February 1996 by the 30-inch telescope Prime Focus Camera at the McDonald Observatory in Texas, shows the entire galaxy, including the bar of stars bisecting the core and the outer spiral arms, which begin near the ends of this bar. The box around the galaxy's core pinpoints the focus of the Hubble image.

The right-hand image shows Hubble's close-up view of the galaxy's core, taken in December 1995 by the Wide Field and Planetary Camera 2. The bluish-purple clumps that form the ring are the clusters of infant stars. Two dark, wispy lanes of dust and a pair of blue spiral arms are just outside the star-forming ring. The lanes of dust are being shepherded into the ring by the longer, primary stellar bar seen in the ground-based (left-hand) image. The gas is trapped inside the ring through the stars' gravitational attraction.

The two spiral arms outside the ring are probably unrelated to the dust lanes, and seem to contain very little dust or gas. The stars in these spiral arms are bluer than most of the galaxy, indicating that many of them are relatively young, less than 200 million years old. However, they are older than those in the ring. This information suggests that the neighborhood of star formation is moving closer to the galaxy's core. Another interpretation has the arms formed through the gravitational interaction of the embedded bar and ring of stars, causing them to spray outward.

This picture was created by combining images taken in ultraviolet, blue, visible, infrared, and H-alpha. The purple color represents hydrogen gas being excited by hot, young star clusters.

Credits: G. Fritz Benedict, Andrew Howell, Inger Jorgensen, David Chapell (University of Texas), Jeffery Kenney (Yale University), and Beverly J. Smith (CASA, University of Colorado), and NASA.

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