

Hubble's high-definition panoramic view of the Andromeda galaxy

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This sweeping bird's-eye view of a portion of the Andromeda galaxy (M31) is the sharpest image ever taken of our galactic next-door neighbor. Credit: NASA, ESA, J. Dalcanton, B.F. Williams, and L.C. Johnson (University of Washington), the PHAT team, and R. Gendler

(Phys.org)—The largest NASA Hubble Space Telescope image ever assembled, this sweeping bird's-eye view of a portion of the Andromeda galaxy (M31) is the sharpest large composite image ever taken of our galactic next-door neighbor. Though the galaxy is over 2 million light-years away, The Hubble Space Telescope is powerful enough to resolve individual stars in a 61,000-light-year-long stretch of the galaxy's pancake-shaped disk. It's like photographing a beach and resolving individual grains of sand. And there are lots of stars in this sweeping view—over 100 million, with some of them in thousands of star clusters seen embedded in the disk.

This ambitious photographic cartography of the Andromeda galaxy represents a new benchmark for precision studies of large spiral [galaxies](#) that dominate the universe's population of over 100 billion galaxies. Never before have astronomers been able to see individual [stars](#) inside an external spiral galaxy over such a large contiguous area. Most of the stars in the universe live inside such majestic star cities, and this is the first data that reveal populations of stars in context to their home galaxy.

Hubble traces densely packed stars extending from the innermost hub of the galaxy seen at the left. Moving out from this central galactic bulge, the panorama sweeps from the galaxy's central bulge across lanes of stars and dust to the sparser outer disk. Large groups of young blue stars indicate the locations of [star clusters](#) and star-forming regions. The stars bunch up in the blue ring-like feature toward the right side of the image. The dark silhouettes trace out complex dust structures. Underlying the entire galaxy is a smooth distribution of cooler red stars that trace Andromeda's evolution over billions of years.

Because the galaxy is only 2.5 million light-years from Earth, it is a much bigger target in the sky than the myriad galaxies Hubble routinely photographs that are billions of light-years away. This means that the Hubble survey is assembled together into a mosaic image using 7,398 exposures taken over 411 individual pointings.

The panorama is the product of the Panchromatic Hubble Andromeda Treasury (PHAT) program. Images were obtained from viewing the galaxy in near-ultraviolet, visible, and near-infrared wavelengths, using the Advanced Camera for Surveys and the Wide Field Camera 3 aboard Hubble. This cropped view shows a 48,000-light-year-long stretch of the galaxy in its natural visible-light color, as photographed with Hubble's Advanced Camera for Surveys in red and blue filters.

The panorama is being presented at the 225th Meeting of the

Astronomical Society in Seattle, Washington.

Provided by NASA

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