

For the First Time Hubble Directly Measures Mass of a Lone White Dwarf

Astronomers using NASA's Hubble Space Telescope have, for the first time, directly measured the mass of a single, isolated white dwarf – the surviving core of a burned-out, Sun-like star.

Researchers used a method called gravitational microlensing to find that the white dwarf, called LAWD 37, is about 50% the mass of our Sun. Until now, white dwarf mass measurements have been gleaned from observations of binary star systems.

The mass agrees with earlier theoretical predictions and corroborates current theories of how white dwarfs evolve. The unique observation yields insights into theories of the structure and composition of white dwarfs.

This graphic shows how microlensing measured the mass of white dwarf star LAWD 37, in the center of this Hubble image. The inset box plots how the dwarf passed in front of a background star in 2019. The wavy blue line traces the dwarf's apparent motion across the sky as seen from Earth. Though the dwarf is following a straight trajectory, the motion of Earth orbiting the Sun imparts an apparent sinusoidal offset. As it passed by the fainter background star, the dwarf's gravitation field warped space. This deflection was precisely measured by Hubble.



Paper: <https://academic.oup.com/mnras/article/520/1/259/6880174?login=true>

Article: <https://www.nasa.gov/feature/goddard/2023/for-the-first-time-hubble-directly-measures-mass-of-a-lone-white-dwarf>