

Star May Be Biggest, Brightest Ever Observed

A University of Florida-led team of astronomers may have discovered the brightest star yet observed in the universe, a fiery behemoth that could be as much as seven times brighter than the current record holder.

But don't expect to find the star — which is at least 5 million times brighter than the sun — in the night sky. Dust particles between Earth and the star block out all of its visible light. Whereas the sun is located only 8.3 light minutes from Earth, the bright star is 45,000 light years away, on the other side of the galaxy. It is detectable only with instruments that measure infrared light, which has longer wavelengths that can better penetrate the dust.

In a National Science Foundation-funded study presented in January at the American Astronomical Society national conference in Atlanta, the team said the star is at least as bright as the Pistol Star, the current record holder, so named for the pistol-shaped nebula surrounding it. The Pistol Star is between 5 million and 6 million times as bright as the sun. However, the new contender, LBV 1806-20, could be as much as 40 million times the sun's brightness.

"We think we've found what may be the most massive and most luminous star ever discovered," said Steve Eikenberry, a UF professor of astronomy and the lead author of a paper on the discovery that was recently submitted to the *Astrophysical Journal*.

In addition to being extremely large, at least 150 times larger than the sun, LBV 1806-20 is extremely young by stellar time — estimated at less than 2 million years old. The sun in our solar system, by contrast, is 5 billion years old.

LBVs have "short and troubled lives," as Eikenberry put it, because "the more mass you have, the more nuclear fuel you have, the faster you burn it up.

They start blowing themselves to bits."

Eikenberry's team made several key advances that led to the estimate of the star's oversized mass and brightness, he said.

One, they sharpened infrared images obtained from the Palomar 200-inch telescope at the California Institute of Technology's Palomar Observatory using a camera equipped with "speckle imaging," a relatively new technology for improving resolution of objects at great distances.

"The shimmering that you see coming off a hot blacktop road in the summer — the upper atmosphere kind of does that with star light," Eikenberry said. "Speckle imaging kind of freezes that motion out, and you get much better images."

Composed of 17 astronomers and graduate students, the team also came

up with an accurate estimate for the distance from the Earth to the bright star. Team members further determined its temperature and how much of the star's infrared light gets absorbed by dust particles as the light makes its way toward Earth. The scientists relied on data collected by the Blanco 4-meter telescope at the National Optical Astronomy Observatory's Cerro Tololo Inter-American Observatory in Chile.

Each of these variables contributed to the estimate of the star's remarkable candlepower. "You correct for dust absorption, then you correct for temperature of the star, you correct for distance of the star — all of those things feed into luminosity," Eikenberry said.

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A star that may be the biggest and brightest in the universe dwarfs the sun in this illustration, drawn to scale to demonstrate the star's massive size. The star, dubbed LBV 1806-20, is at least 150 times larger and 5 million times brighter than the sun.