

PRESS RELEASE

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Discovery of a very massive, isolated star in a nearby galaxy

Based on the article "The VLT-FLAMES Tarantula Survey. III. A very massive star in apparent isolation from the massive cluster R136", by J. M. Bestenlehner et al.

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***Astronomy & Astrophysics* is publishing the discovery of a very massive, isolated star in the Large Magellanic Cloud. The star VFTS 682 is 150 times more massive than our Sun and seems to be isolated and not a member of any rich star cluster, which is surprising since very massive stars are thought to form in the dense core of clusters.**

Astronomy & Astrophysics is publishing the discovery of a very massive, isolated star in a galaxy near our Milky Way. Located in the Large Magellanic Cloud (LMC), the star VFTS 682 is one of the more massive stars ever known, because it is about 150 times the mass of the Sun. But the major surprise is that the star lies on its own and is not a member of a dense star cluster.

The international team of astronomers [1] who are publishing this discovery is involved in a large survey of the Tarantula Nebula in the LMC. The region in and around the Tarantula Nebula is a well-known stellar nursery. Their survey, carried out with the FLAMES instrument at the ESO/VLT, is meant to study massive stars there. The new results on VFTS 682 are among the first of this survey [2].

When it was first observed a few years ago, VFTS 682 was not found to be very massive. The team has now shown that a large part of its light is absorbed and scattered by dust on its way to the Earth and that the star is actually much brighter than first thought, hence much more massive.

Up to now, astronomers have believed that very massive stars (up to 300 times the mass of the Sun) could only exist at the center of very dense star clusters. The team members were therefore very surprised that VFTS 682 is situated away from any cluster. However, the star is near the rich star cluster R136, where very similar massive stars have been observed. One hypothesis to explain the apparent isolation of that star is that it might have been ejected from the cluster. Such "runaway stars" have already been observed but they are all much smaller, so much stronger gravitational effects are needed to explain the ejection of such a massive star. On the other hand, astronomers can hardly explain how such a massive star could form in its current isolated position. In either case, VFTS 682 is an exciting object that challenges theories of massive star formation.

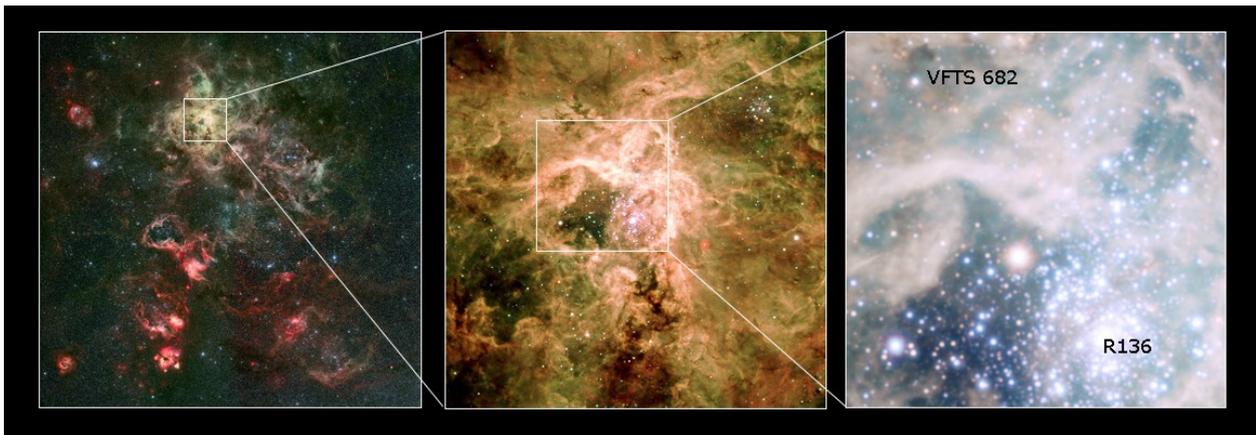


Fig. 1. The star cluster R136 located in the Tarantula Nebula. The star VFTS 682 is located about 100 light years from the cluster. © ESO.

[1] The team of astronomers includes J. M. Bestenlehner, J. S. Vink, G. Gräfener (Armagh Observatory, UK), F. Najarro (CSIC-INTA, Spain), C. J. Evans (Royal Observatory of Edinburgh, UK), N. Bastian, E. Bressert (University of Exeter, UK), A. Z. Bonanos (National Observatory of Athens, Greece), P. A. Crowther, E. Doran (University of Sheffield, UK), K. Friedrich, N. Langer (Bonn University, Germany), V. Hénault-Brunet, W. D. Taylor (University of Edinburgh, UK), A. Herrero (University of La Laguna, Spain), A. de Koter, H. Sana (University of Amsterdam, The Netherlands), D. J. Lennon (ESA/STScI), J. Maiz Apellaniz (IAA-CSIC, Granada, Spain), I. Soszynski (Warsaw University Observatory, Poland).

[2] Two previous articles dedicated to the VLT-FLAMES Tarantula Survey have already been published in *Astronomy & Astrophysics*: Evans et al. ([A&A, 530, A108](#)) and Taylor et al. ([A&A, 530, L10](#)). The acronym VFTS in the star's name stands for the name of the survey.

The VLT-FLAMES Tarantula Survey. III. A very massive star in apparent isolation from the massive cluster R136, by J. M. Bestenlehner, J. S. Vink, G. Gräfener, et al.
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