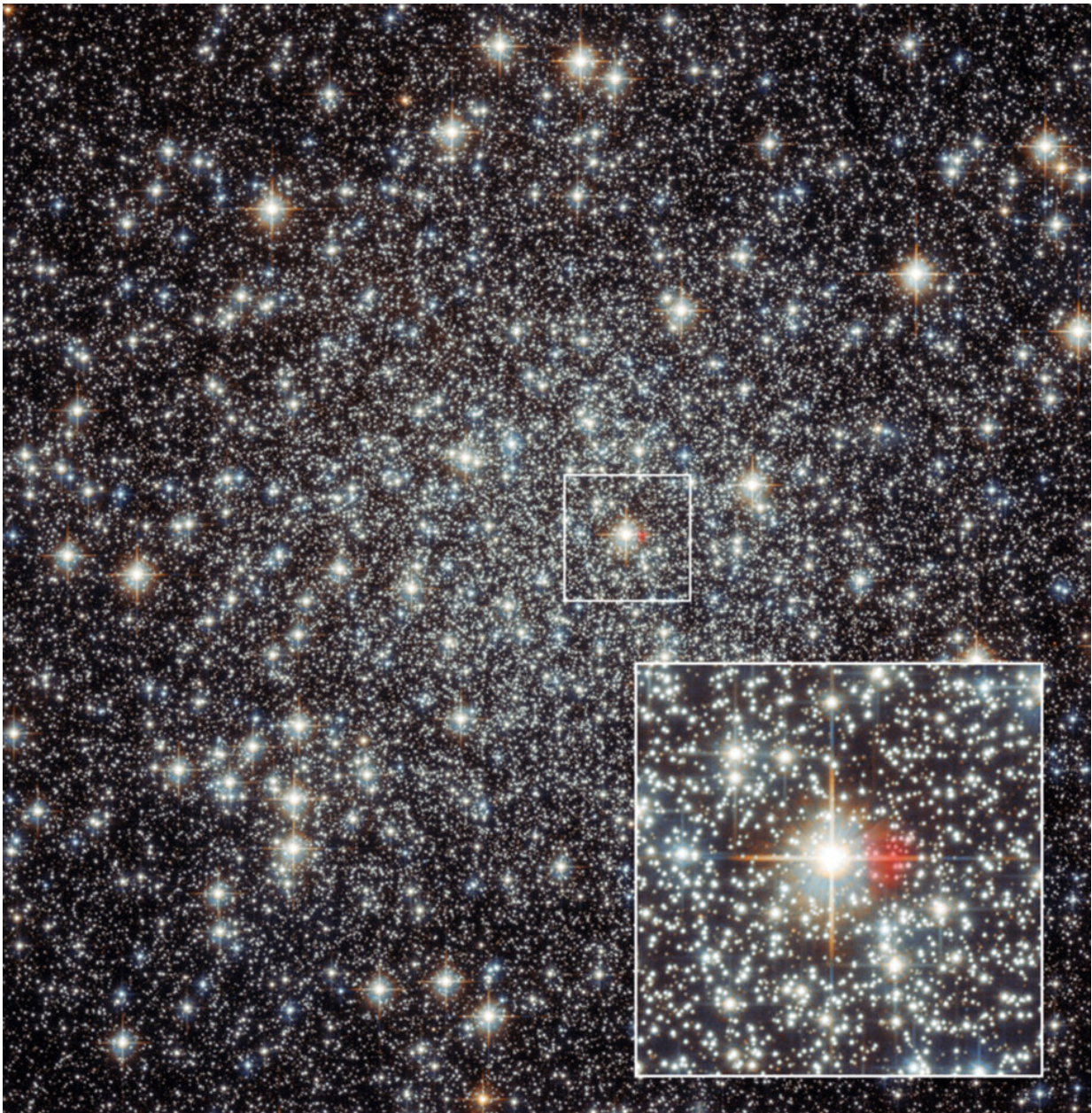


Astronomers discover 2,000-year-old remnant of a nova

April 30 2019



Near the centre of the globular cluster Messier 22, the team of scientists discovered the remains of a nova. Credit: ESA/Hubble and NASA, F Göttgens (IAG)

For the first time, a European research team involving the University of Göttingen has discovered the remains of a nova in a galactic globular cluster. The remnant is located near the centre of the globular cluster Messier 22 and has recently been observed using modern instruments. The results will be published in the journal *Astronomy & Astrophysics*.

A [nova](#) is an explosion of hydrogen on the surface of a star that makes it much brighter. The remains form a glowing nebula. "The position and brightness of the remains match an entry from 48 BC in an ancient collection of observations by Chinese astronomers," says first author Fabian Göttgens of the Institute for Astrophysics at the University of Göttingen. He carried out this Ph.D. research in the Stellar Astrophysics research group led by Professor Dreizler. "They probably saw the original nova in the same place," he adds. This means modern measurements confirm one of the oldest observations of an event outside the solar system.

Globular clusters are large, spherical clusters of several hundreds of thousands of very old [stars](#) that orbit together around their home galaxy. There are 150 known globular clusters orbiting the Milky Way. Messier 22 is one of these star clusters. It lies in the constellation Sagittarius in the direction of the centre of the Milky Way. It was observed together with two dozen other [globular clusters](#) with the instrument MUSE at the Very Large Telescope of the ESO in Chile. The MUSE instrument was developed with the participation of the Institute for Astrophysics, which was funded by the BMBF. It not only produces images, it also

simultaneously splits starlight by colour, measuring the brightness of stars as a function of colour. This makes it particularly suitable for finding nebulae that often only glow in a certain colour—usually red.

The newly discovered remains of the nova form a red shining nebula of hydrogen gas and other gases, which has a diameter of about 8,000 times the distance between Earth and sun. Despite its size, the nebula is relatively light, with a mass about 30 times that of Earth, because the gas was dispersed by the explosion.

侍中諸曹九卿郡守皆謀反咸伏其辜

黃龍元年三月客星居王梁東北可九尺長丈餘西指出閣道間至紫宮其十二月宮車晏駕

元帝初元元年四月客星大如瓜色青白在南斗第二星東可四尺占曰爲水饑其五月勃海水大溢六月關東大饑民多餓死琅邪郡人相食

二年五月客星見昴分居卷舌東可五尺青白色炎長三寸占曰天下有妄言者其十二月鉅鹿都尉謝君男詐爲神人論死父免官

孟康曰姓謝名君男者兒也 不記其名直言男耳

五年四月彗星出西北赤黃色長八尺所後數日長丈

This Chinese text (marked in orange) from an ancient collection of observations (<https://ctext.org/>) describes a sighting of the original Nova by Chinese astronomers from the year 48 BC Credit: The Chinese Text Project ctext.org/



The telescope used to view the 2,000-year-old remnant of the nova: the most powerful laser guide star system in the world showing its four laser beams coming from the system at the main telescope 4 at the VLT (Very Large Telescope). Credit: ESO / F Kamphues

More information: Fabian Göttgens et al. Discovery of an old nova remnant in the Galactic globular cluster M22. *Astronomy & Astrophysics* (2019). DOI: [10.1051/0004-6361/201935221](https://doi.org/10.1051/0004-6361/201935221) , Preprint: arXiv:1904.11515: arxiv.org/abs/1904.11515

Provided by University of Göttingen

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