

# The flare star WX UMa becomes 15 times brighter in less than three minutes

June 14 2013

---



A flare star. Credit: Casey Reed/NASA

Astrophysicists at the University of Santiago de Compostela (Spain) and the Byurakan Observatory (Armenia) have detected a star of low luminosity which within a matter of moments gave off a flare so strong that it became almost 15 times brighter. The star in question is the flare star WX UMa.

"We recorded a strong flare of the star WX UMa, which became almost 15 times brighter in a matter of 160 seconds," explains to SINC the [astrophysicist](#) Vakhtang Tamazian, professor at the University of

Santiago de Compostela. The finding has been published in the 'Astrophysics' journal.

This star is in the Ursa Major constellation, around 15.6 light years from the Earth, and it forms part of a [binary system](#). Its companion shines almost 100 times brighter, except at times such as that observed, in which the WX UMa gives off its flares. This can happen several times a year, but not as strongly as that which was recorded in this instance.

Dr Tamazian and other researchers detected this exceptional brightness from the Byurakan Observatory in Armenia. "Furthermore, during this period of less than three minutes the star underwent an [abrupt change](#) from spectral type M to B; in other words, it went from a temperature of 2,800 kelvin (K) to six or seven times more than that."

Based on their spectral [absorption lines](#), [stars](#) are classified using letters. Type M stars have a surface temperature of between 2,000 and 3,700 K; Type B between 10,000 and 33,000 K.

WX UMa belongs to the limited group of "flare stars", a class of [variable stars](#) which exhibit increases in brightness of up to 100 factors or more within a matter of seconds or minutes. These increases are sudden and irregular – practically random, in fact. They then return to their normal state within tens of minutes.

Scientists do not know how this flaring arises, but they know how it develops: "For some reason a small focus of instability arises within the plasma of the star, which causes turbulence in its magnetic field," explains Tamazian. "A magnetic reconnection then occurs, a conversion of energy from the magnetic field into kinetic energy, in order to recover the stability of the flow, much like what happens in an electric discharge."

Next, kinetic energy in the plasma transforms into thermal energy in the upper layers of the atmosphere and the star's corona. This significant rise in the temperature and brightness of the star enables astronomers to detect changes in the radiation spectrum.

"Photometric and spectroscopic monitoring of this kind of flare stars is very relevant because it provides us with information about the changing states and physical processes, which are in turn key to studying the formation and evolution of stars," Tamazian explains.

Additionally, in cases of binary systems such as that which unites WX UMa with its companion, "observation of flares acquires a special importance, because we can investigate whether there is any relation between the frequency of flares and the position of the pair of stars on their orbit, a question which remains open."

To carry out this study, in which flares in other binary systems (HU Del, CM Dra and VW Com) have also been analysed, the SCORPIO camera of the Byurakan Astrophysical Observatory was used. This camera enables both the spectrum and the brightness of these objects to be detected.

Flare stars are intrinsically weak, and can therefore only be observed at relatively short distances in astronomic terms, specifically in the vicinity of the Sun, up to a distance of a few tens of [light years](#).

**More information:** N. D. Melikian, V. S. Tamazian, R. Sh. Natsvlshvili, A. A. Karapetian. "Spectral observations of flare stars in the neighborhood of the Sun". *Astrophysics* 56 (1): 8-18, March 2013. [link.springer.com/article/10.1007%2Fs10511-013-9263-z](http://link.springer.com/article/10.1007%2Fs10511-013-9263-z)

Provided by Plataforma SINC

Citation: The flare star WX UMa becomes 15 times brighter in less than three minutes (2013, June 14) retrieved 15 May 2024 from <https://phys.org/news/2013-06-flare-star-wx-uma-brighter.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.