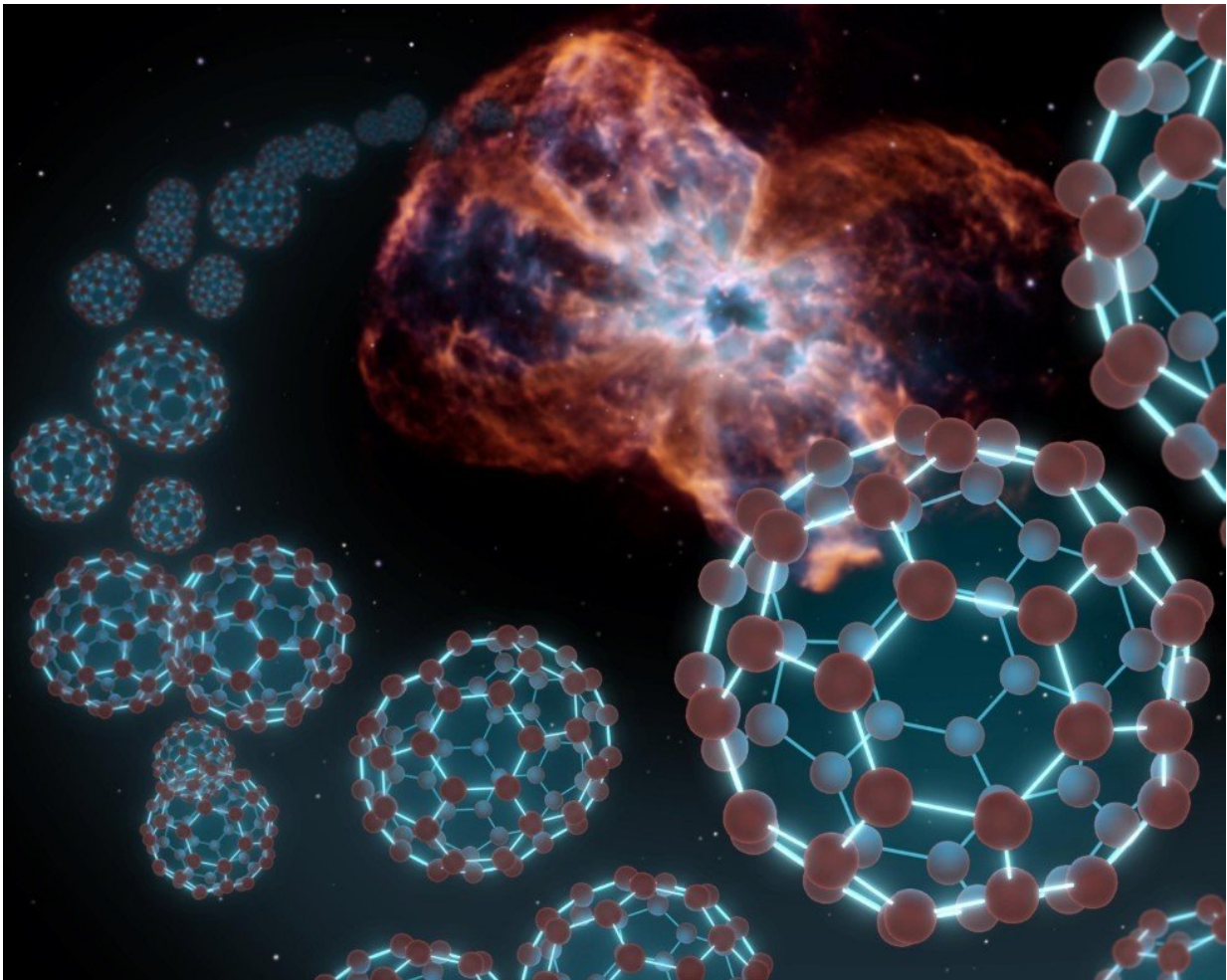


Interstellar fullerenes may help find solutions for earthly matters

January 30 2018



Credit: Kazan Federal University

Fullerenes were first discovered by Harry Kroto in the 1970s, for which he and his colleagues received a Nobel Prize in Chemistry. Recently, fullerenes have been detected in the stellar winds of red giants and in the interstellar medium.

Fullerenes are potent antioxidants and are used in antiviral medications. In particular, fullerenes with anti-HIV properties have been discovered. They are also used as semiconductors, even [high-temperature superconductors](#). Currently, they are synthesized in near-gram quantities. One of the more popular production methods is the graphite electrode arc process. Researchers hypothesize that in deep vacuum conditions with low density, fullerenes are created in other, as yet unknown ways.

A group of astronomers is currently engaged in studies of fullerenes in the interstellar medium. Together, they have contributed to a recent paper in *Monthly Notices of the Royal Astronomical Society*.

The nearest interstellar clouds with confirmed [fullerene](#) are about 1,000 light-years away from Earth. Electromagnetic spectra of 19 distant stars were provided by the VLT telescope in Chile, one of the largest in the world. The authors found fullerenes which left detectable absorption lines in certain frequencies.

Dr. Vladislav Shimansky says, "We know which frequencies have lines of fullerenes, but the main difficulty is to separate the [interstellar medium](#) spectrum from the star spectrum. We can obtain fullerene lines by subtracting star spectra from the existing spectrum, a complicated process. Firstly, we discovered some parameters of stars, and some of these [stars](#) are unique objects. We compare fullerene-bearing clouds with non-fullerene clouds to find out which environmental parameters capacitate the formation of such molecules. In our research, we found that in some clouds the molecules are in an excited state, and in some they are not. This leads us to believe that the ways of their formation are

different."

More information: G. A. Galazutdinov et al, C60+– looking for the bucky-ball in interstellar space, *Monthly Notices of the Royal Astronomical Society* (2016). [DOI: 10.1093/mnras/stw2948](https://doi.org/10.1093/mnras/stw2948)

Provided by Kazan Federal University

Citation: Interstellar fullerenes may help find solutions for earthly matters (2018, January 30) retrieved 24 April 2024 from <https://phys.org/news/2018-01-interstellar-fullerenes-solutions-earthly.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.