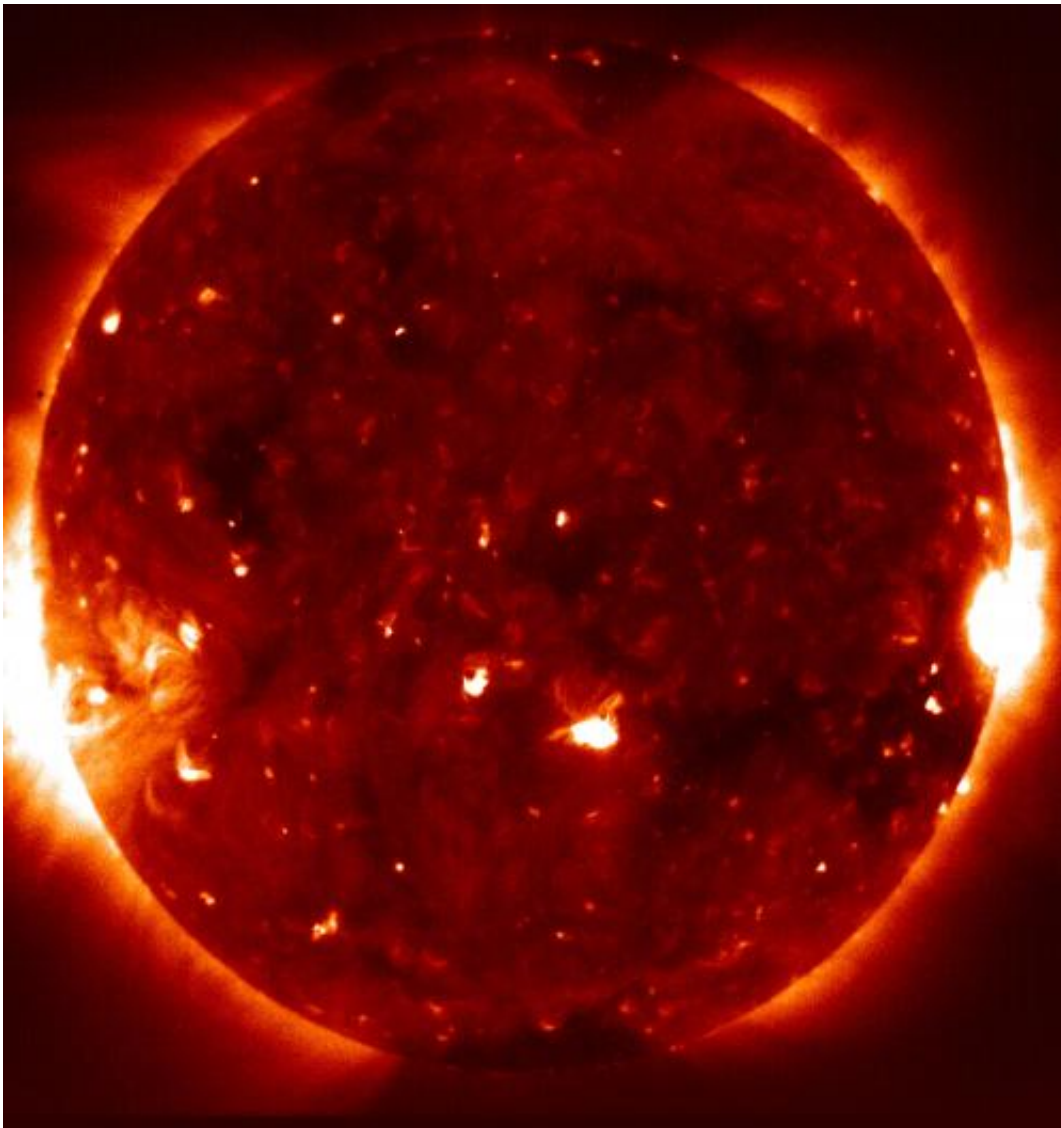


# Observations to help astrophysicist understand sun's Alfvén waves

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This is a NASA X-ray image of the sun. Credit: NASA

UT Arlington physics professor Zdzislaw E. Musielak has been awarded a three-year, \$301,339 National Science Foundation grant to investigate Alfvén waves in the Sun, a phenomenon vital to understanding Earth's nearest star.

"The Sun is the source of energy that sustains all life on Earth, but there is much that remains unknown about it," said Musielak, a two-time winner of the international Humboldt Prize for his research into the sun and solar-type stars. "With this research, we hope to explore one of the great mysteries – what forces fuel the heat of the Sun's [outer atmosphere](#) and the basic physical processes for creating its magnetic influence on Earth and other planets."

Alfvén waves are magnetic [plasma waves](#) named after Hannes Alfvén, who received a Nobel Prize in 1970 for their prediction. Their existence helps explain why the Sun's corona, or upper atmosphere, is hotter than the solar surface. Understanding Alfvén waves is also crucial to explaining the speed of solar winds, a stream of highly-charge particles released into space by the Sun.

The existence of Alfvén waves has been verified in many laboratory experiments. Until recently, neither ground-based observations nor [space missions](#) could unambiguously prove their existence on the Sun.

NASA's Hinode [solar observatory](#) and the Swedish Solar Telescope recently broke the observational barrier – detecting clear signatures of Alfvén waves in different parts of the [solar atmosphere](#). The discovery has triggered extensive theoretical studies around the world.

Musielak and his team plan to use FLASH code, a publicly available, multi-physics, multi-scale simulation code developed at the Flash Center for Computational Science at the University of Chicago.

"Dr. Musielak is respected internationally for his contributions to astrophysics," said Pamela Jansma, dean of the UT Arlington College of Science. "With support from the National Science Foundation, his new work will help scientists around the world further their understanding of the Sun."

Alexander Weiss, chairman of the UT Arlington physics department, said: "The funding of Dr. Musielak's proposal is a strong endorsement by his peers of the high quality and importance of his work."

Provided by University of Texas at Arlington

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