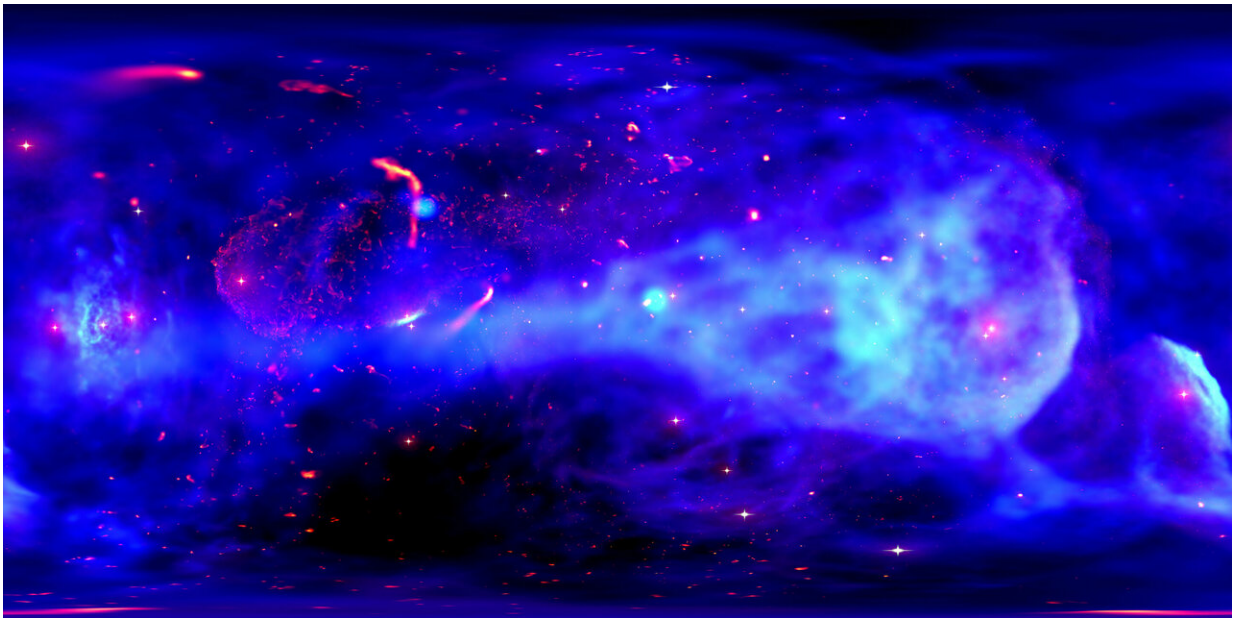


# Galactic center visualization delivers star power

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Credit: NASA/CXC/Pontifical Catholic Univ. of Chile /C.Russell et al.

Want to take a trip to the center of the Milky Way? Check out a new immersive, ultra-high-definition visualization. This 360-movie offers an unparalleled opportunity to look around the center of the galaxy, from the vantage point of the central supermassive black hole, in any direction the user chooses.

By combining NASA Ames supercomputer simulations with data from

NASA's Chandra X-ray Observatory, this visualization provides a new perspective of what is happening in and around the center of the Milky Way. It shows the effects of dozens of massive stellar giants with fierce winds blowing off their surfaces in the region a few light years away from the supermassive black hole known as Sagittarius A\* (Sgr A\* for short).

These winds provide a buffet of material for the supermassive black hole to potentially feed upon. As in a previous visualization, the viewer can observe dense clumps of material streaming toward Sgr A\*. These clumps formed when winds from the massive stars near Sgr A\* collide. Along with watching the motion of these clumps, viewers can watch as relatively low-density gas falls toward Sgr A\*. In this new visualization, the blue and cyan colors represent X-ray emission from hot gas, with temperatures of tens of millions of degrees; red shows moderately dense regions of cooler gas, with temperatures of tens of thousands of degrees; and yellow shows of the cooler gas with the highest densities.

A collection of X-ray-emitting gas is seen to move slowly when it is far away from Sgr A\*, and then pick up speed and whip around the viewer as it comes inwards. Sometimes clumps of gas will collide with gas ejected by other stars, resulting in a flash of X-rays when the gas is heated up, and then it quickly cools down. Farther away from the viewer, the movie also shows collisions of fast stellar winds producing X-rays. These collisions are thought to provide the dominant source of hot gas that is seen by Chandra.

When an outburst occurs from gas very near the black hole, the ejected gas collides with material flowing away from the [massive stars](#) in winds, pushing this material backwards and causing it to glow in X-rays. When the outburst dies down the winds return to normal and the X-rays fade.

The 360-degree video of the Galactic Center is ideally viewed through

virtual reality (VR) goggles, such as Samsung Gear VR or Google Cardboard. The video can also be viewed on smartphones using the YouTube app. Moving the phone around reveals a different portion of the movie, mimicking the effect in the VR goggles. Finally, most browsers on a computer also allow 360-degree videos to be shown on YouTube. To look around, either click and drag the video, or click the direction pad in the corner.

Dr. Christopher Russell of the Pontificia Universidad Católica de Chile (Pontifical Catholic University) presented the new visualization at the 17th meeting of the High-Energy Astrophysics (HEAD) of the American Astronomical Society held in Monterey, Calif. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

Provided by Chandra X-ray Center

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