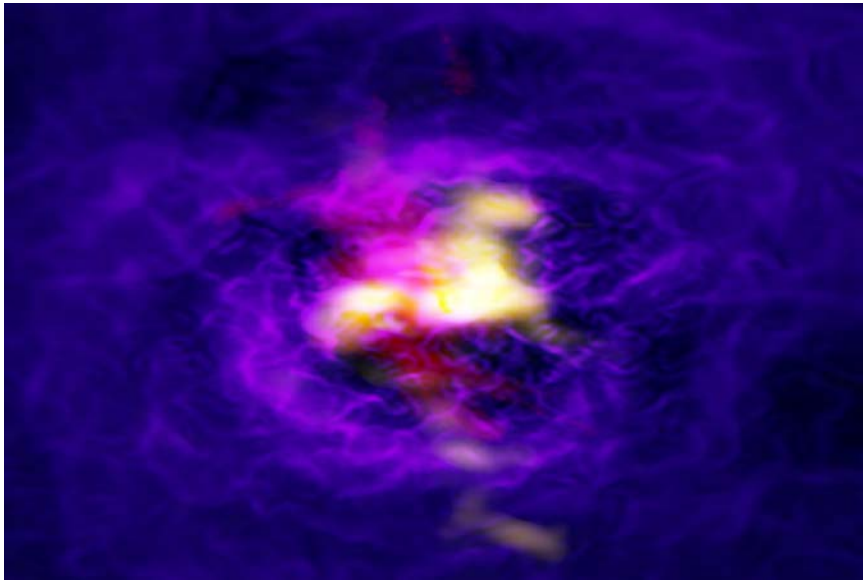
Chandra Science Highlight

A Galaxy-Scale Fountain Powered by a Supermassive Black Hole



Caption : Multiwavelength image of the Brightest Cluster Galaxy in Abell 2597 showing data from NASA's Chandra X-ray Observatory in purple, ESO's Very Large Telescope (optical) in red, and the Atacama Large Millimeter/submillimeter Array in yellow.

Distance estimate: 1.1 billion light years (redshift z=0.0821)

Scale: Image is about 15 arcmin (about 75,000 light years) across.

- The optical nebula traces the warm envelopes of many cold molecular clouds embedded in the hot X-ray atmosphere..
- The molecular clouds show evidence for inflow toward the central supermassive black hole (SMBH), outflow along jets launched by the SMBH, and uplift by buoyant hot bubbles.
- The emerging picture is one of a galactic-size fountain, wherein gas clouds rise and then fall back toward the black hole.
- When the clouds reach the center of the galaxy, they stimulate another outburst from the central black hole as part of an ongoing cycle with a time scale ~100 Myr.

Credits: X-ray: NASA/CXC/SAO/G.Tremblay et al; Radio:ALMA: ESO/NAOJ/NRAO/G.Tremblay et al, NRAO/AUI/NSF/B.Saxton; Optical: ESO/VLT

Instrument: ACIS

Reference: G. Tremblay et al, 2018, Apj, 865,13; arXiv:1808.00473

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