



Chandra X-Ray Observatory Center

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Perseus Cluster: A galaxy cluster about 250 million light years from Earth.

Credit: NASA/CXC/IoA/A.Fabian et al.

Chandra's 53-hour observation of the central region of the Perseus galaxy cluster (left) has revealed wavelike features (right) that appear to be sound waves. The features were discovered by using a special image-processing technique to bring out subtle changes in brightness. These sound waves are thought to have been generated by explosive events occurring around a supermassive black hole (bright white spot) in Perseus A, the huge galaxy at the center of the cluster. The image also shows two vast, bubble-shaped cavities filled with high-energy particles and magnetic fields. They create the sound waves by pushing the hot X-ray emitting gas aside. The pitch of the sound waves translates into the note of B flat, 57 octaves below middle-C. This frequency is over a million billion times deeper than the limits of human hearing, so the sound is much too deep to be heard.

Scale: Left panel is 284 arcsec on a side; right panel is 400 arcsec on a side.

Chandra X-ray Observatory ACIS Image

CXC operated for NASA by the Smithsonian Astrophysical Observatory