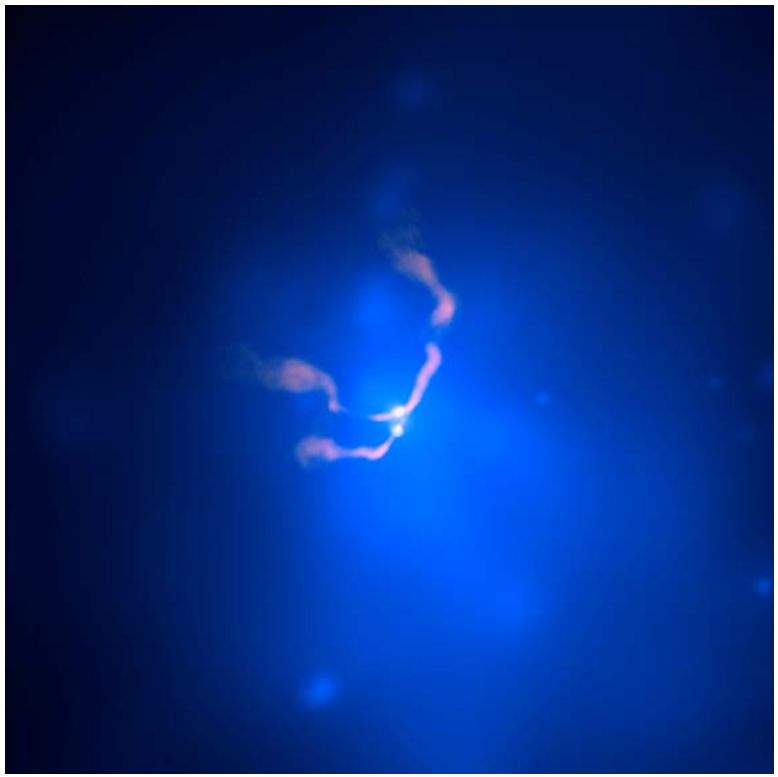
Chandra Science Highlight

A Pair of Supermassive Black Holes in the Galaxy Cluster Abell 400



Chandra X-ray Observatory ACIS image.

Credit: X-ray: NASA/CXC/AIfA/D.Hudson & T.Reiprich et al.;
Radio: NRAO/VLA/NRL

This composite X-ray (blue)/radio (pink) image of the galaxy cluster Abell 400 shows radio jets immersed in a vast cloud of multimillion degree X-ray emitting gas that pervades the cluster. The jets emanate from the vicinity of two supermassive black holes (bright spots in the image). These black holes are in the dumbbell galaxy NGC 1128, which has produced the giant radio source, 3C 75.

- The shape and orientation of the radio jets were used to determine the velocity of the motion of the black holes through the hot gas.
- The deduced velocity implies that the two black holes, which are about 25,000 light years apart, are gravitationally bound.
- Computer simulations indicate that binary supermassive black holes gradually spiral toward each other until they coalesce to form a single, more massive black hole, accompanied by an enormous burst of gravitational waves.

Reference: D. Hudson et al. 2006, Astronomy & Astrophysics (in press), see also astro-ph/0603272