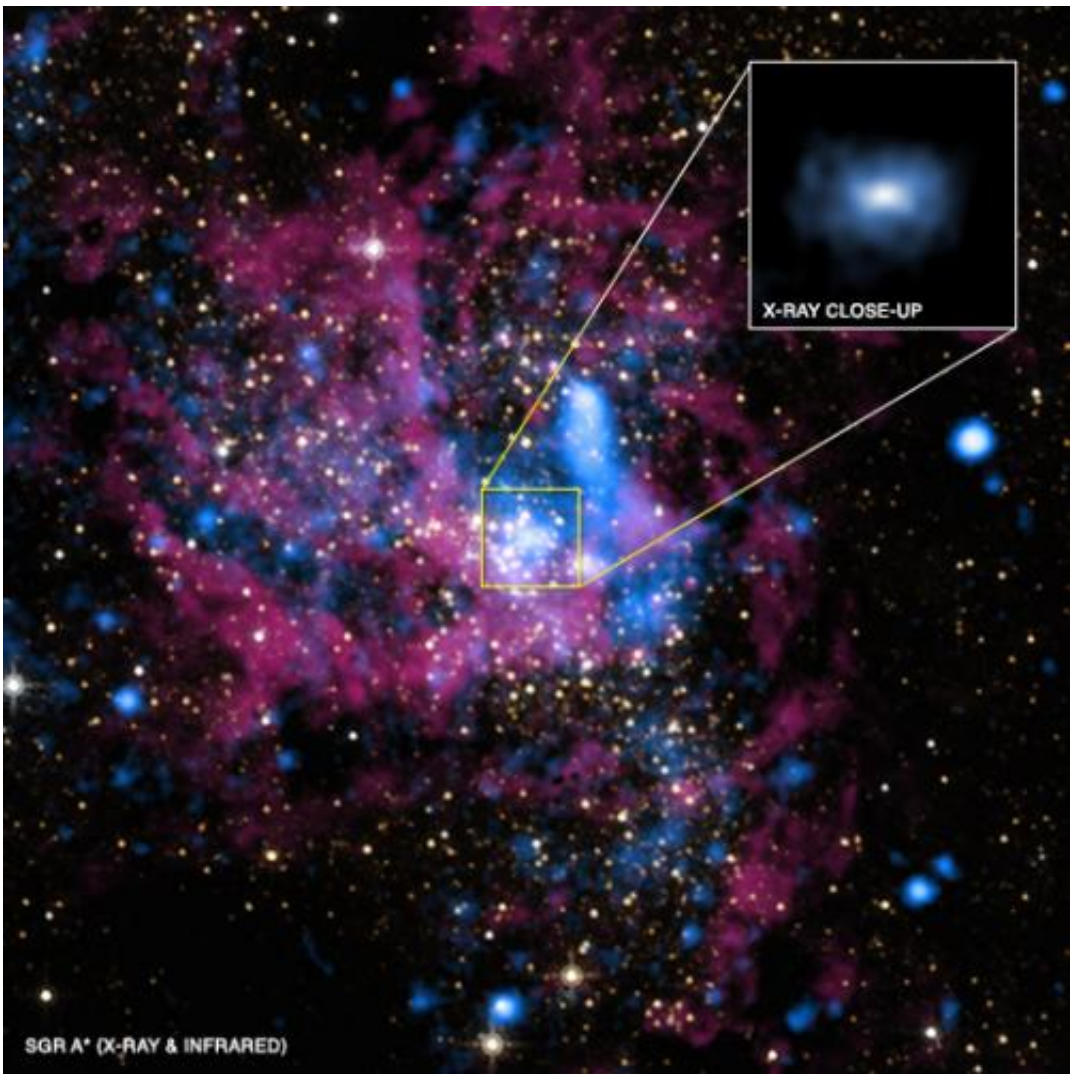
Pair of researchers suggest black holes at center of galaxies might instead be wormholes

May 30 2014, by Bob Yirka



Credit: X-ray: NASA/UMass/D.Wang et al., IR: NASA/STScI

(Phys.org) —Zilong Li and Cosimo Bambi with Fudan University in Shanghai have come up with a very novel idea—those black holes that are believed to exist at the center of a lot of galaxies, may instead by wormholes. They've written a paper, uploaded to the preprint server *arXiv,* describing their idea and how what they've imagined could be proved right (or wrong) by a new instrument soon to be added to an observatory in Chile.

Back in 1974, space scientists discovered Sagittarius A* (SgrA ∗)—a bright source of radio waves emanating from what appeared to be near the center of the Milky Way galaxy. Subsequent study of the object led scientists to believe that it was (and is) a black hole—the behavior of stars nearby, for example, suggested it was something massive and extremely dense.

What we're able to see when we look at SgrA∗ are plasma gasses near the event horizon, not the object itself as light cannot escape. That should be true for wormholes too, of course, which have also been theorized to exist by the Theory of General Relativity. Einstein even noted the possibility of their existence. Unfortunately, no one has ever come close to proving the existence of wormholes, which are believed to be channels between different parts of the universe, or even between two universes in multi-universe theories. In their paper, Li and Bambi suggest that there is compelling evidence suggesting that many of the objects we believe to be black holes at the center of galaxies, may in fact be wormholes.

Plasma gases orbiting a black hole versus a wormhole should look different to us, the pair suggest, because wormholes should be a lot smaller. Plus, the presence of wormholes would help explain how it is that even new galaxies have what are now believed to be black holes—such large black holes would presumably take a long time to become so large, so how can they exist in a new galaxy? They can't Li

and Bambi conclude, instead those objects are actually wormholes, which theory suggests could spring up in an instant, and would have, following the Big Bang.

Making the two's speculation more exciting is the soon to be installed piece of equipment known as GRAVITY—it will be added to the European Space Observatory in Chili, giving researchers there an unprecedented view of SgrA∗ (and other black holes). In just a couple of years, it should be possible to prove whether Li and Bambi's idea is correct or not—the photon capture sphere of the wormhole should be much smaller than that for a black hole, they note—if that's the case with SgrA ∗, space scientists will have to do some serious rethinking of wormholes and how they might fit in to current theories describing the universe.

More information: Distinguishing black holes and wormholes with orbiting hot spots, arXiv:1405.1883 [gr-qc] arxiv.org/abs/1405.1883

Abstract
The supermassive black hole candidates at the center of every normal galaxy might be wormholes created in the early Universe and connecting either two different regions of our Universe or two different universes in a Multiverse model. Indeed, the origin of these supermassive objects is not well understood, topological non-trivial structures like wormholes are allowed both in general relativity and in alternative theories of gravity, and current observations cannot rule out such a possibility. In a few years, the VLTI instrument GRAVITY will have the capability to image blobs of plasma orbiting near the innermost stable circular orbit of SgrA∗, the supermassive black hole candidate in the Milky Way. The secondary image of a hot spot orbiting around a wormhole is substantially different from the one of a hot spot around a black hole, because the photon capture sphere of the wormhole is much smaller, and its detection could thus test if the center of our Galaxy harbors a

wormhole rather then a black hole.

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