Monster black holes, quietly cruising the cosmos?

by Bend_Weekly_News_Sources

Two mergÂ-ing black holes can genÂ-erÂ-ate a reÂ-coil so powÂ-erÂ-ful, the merged hole shoots out of its host galÂ-axy at up to 2,500 miles per secÂ-ond, acÂ-cordÂ-ing to a new comÂ-putÂ-er simÂ-ulaÂ-tÂ-ion.Its creÂ-ators said the work shows for the first time that these viÂ-oÂ-lent events, which folÂ-low mergÂ-ers of gaÂ-laxÂ-ies conÂ-tainÂ-ing black holes, can toÂ-tally eject the black holes. So these tiÂ-taÂ-nic obÂ-jects may be cruisÂ-ing through the unÂ-iverse, virÂ-tuÂ-ally inÂ-visÂ-iÂ-ble unÂ-less they should crash inÂ-to someÂ-thing. But donâ€™t worÂ-ry, asÂ-troÂ-noÂ-mers said. Most of the unÂ-iverse by far is empÂ-ty space. The odds that a black hole will streak through our soÂ-lar sysÂ-tem are tiÂ-ny.Black holes are exÂ-tremely comÂ-pact obÂ-jects that conÂ-tain so much matÂ-ter crammed inÂ-to so small a space that their graÂ-vity beÂ-comes overÂ-powÂ-ering and sucks in eveÂ-ryÂ-thing nearÂ-by, inÂ-cludÂ-ing light. DeÂ-spite their light-eating talÂ-ents, many black holes are asÂ-sociatÂ-ed with inÂ-tense light emisÂ-sions, beÂ-cause the in falling obÂ-jects heat up and shine. But a black hole with nothÂ-ing to feed on, called a â€œquiÂ-esÂ-centâ€• black hole, is dark.Most luÂ-miÂ-nous gaÂ-laxÂ-ies are believed to conÂ-tain a giÂ-ant, or super massive, black hole at their cenÂ-ter. The simÂ-ulaÂ-tÂ-ion, led by Manuela CamÂ-panÂ-elli at the RochÂ-esÂ-ter InÂ-stiÂ-tute of TechÂ-nolÂ-oÂ-gy, N.Y., studÂ-ied the best conÂ-diÂ-tions for merÂ-gers to proÂ-duce reÂ-coil speeds high enough to free a super massive black hole from its host galÂ-axy. The reÂ-coil would reÂ-sult when, upÂ-on crashÂ-ing, the black holes creÂ-ate an exÂ-otÂ-ic type of radiaÂ-tÂ-ion called gravitaÂ-tÂ-ional waves. In CamÂ-panÂ-elliâ€™s sceÂ-narÂ-iÂ-o, two black holes apÂ-proach and start to orÂ-bit each othÂ-er. To proÂ-duce toÂ-tal ejection, they should have equal massÂ-es and spin as fast as posÂ-siÂ-ble. They must be tilted with their axÂ-es of rotaÂ-tÂ-ion lyÂ-ing in the plane of their orÂ-bit, and must spin in opÂ-poÂ-site diÂ-recÂ-tions. They spirÂ-al toÂ-ward one anothÂ-er, and when they merge, the reÂ-sulting obÂ-ject is kicked off peÂ-rpendicularly to the plane of orÂ-bit. Some asÂ-tÂ-roÂ-physÂ-iÂ-cists have arÂ-gued that such conÂ-diÂ-tions are rathÂ-er unÂ-likeÂ-ly; sciÂ-enÂ-tists said the probÂ-aÂ-bilÂ-ity of such a conÂ-fluÂ-ence of events reÂ-mains a quesÂ-tion for fuÂ-ture reÂ-search.Past calÂ-culaÂ-tÂ-ions have found that black hole ejections may not be unÂ-comÂ-mon. But the exÂ-pelled black hole can easily fall back inÂ-to the galÂ-axy due to conÂ-tinÂ-uÂ-ing gravitaÂ-tÂ-ional atÂ-tracÂ-tion beÂ-tween the two, just as a canÂ-nonÂ-ball shot to the sky reÂ-turns to the ground.A secÂ-ond new stuÂ-dy, by AbraÂ-ham Loeb of HarÂ-vard UnÂ-iversÂ-ity in CamÂ-bridge, Mass., exÂ-amÂ-ined the posÂ-siÂ-bilÂ-ity of deÂ-tectÂ-ing a black hole if it is exÂ-pelled. If itâ€™s surÂ-rounded by gas, he said, that gas will emit powÂ-erÂ-ful light. UnÂ-forÂ-tuÂ-nateÂ-ly, by the time it leaves the galÂ-axy, it will likely exÂ-haust its gas supply and go dark.NoneÂ-theÂ-less, one visÂ-iÂ-ble obÂ-ject known as HE0450-2958, esÂ-tiÂ-matÂ-ed to lie more than three bilÂ-lion light-years away, is theÂ-oÂ-rized by some to be an ejected super massive black hole. One of the reÂ-searchÂ-ers who adÂ-vanced the proÂ-posÂ-al has said this black hole may be one of those that one day reÂ-turns to its home galÂ-axy. Itâ€™s esÂ-tiÂ-matÂ-ed to have been movÂ-ing much more slowly on avÂ-erÂ-age than the fully-eÂ-jected monoÂ-liths that CamÂ-panÂ-elli studÂ-ied, enÂ-hancÂ-ing the likeÂ-liÂ-hood of an evenÂ-tuÂ-al fallÂ-back.LoeÂ-bâ€™s and CamÂ-panÂ-elliâ€™s studÂ-ies are to apÂ-pear in forthÂ-comÂ-ing isÂ-sues of the reÂ-search jourÂ-nal PhysÂ-iÂ-cal ReÂ-view LetÂ-ters.

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