Since the force of gravity varies as the square of the inverse distance between objects why not make the ultimate extrapolation and let the distance go to zero? You get a LOT of density. Maybe it goes BOOM! But wait a minute, maybe it goes in the opposite direction and goes MOOB! Whatever. Most astronomers decided anyway that this was the only source that could explain the observed jets and explosions in galaxies. Of course it gets very complicated. Also there are a few annoying details right from the beginning:

1) If you watch a Black Hole form, it takes an infinity of time for something to fall in. So Instead of everything falling in it looks like nothing ever falls "in". The orthodox answer is that, well, it comes as close as you want. (But maybe not in a Big Bang Universe that is only 15 billion years old.)

Then again how would you like a black hole of 10 billion solar masses (the mass of a whole galaxy) completely formed only a billion years from the Big Bang beginning? The discoverers spoke freely in the popular press[1] but typically only mentioned in one sentence in the the journal paper as: ". . . formation of such a high M black hole after $\sim 1Gyr$ is difficult to understand."[2]

Accretion processes onto Black Holes are supposed to enable them to radiate high energy X-rays. When X-ray telescopes found strong X-ray sources in galaxies they said, aha, this is too strong to be an X-ray star so it must be a black hole in orbit around a star - a binary with a massive black hole revolving around it. Discovery of these now MASSIVE Black holes was so exciting that innumerable papers have appeared showing the X-ray positions and deep photographs at the positions the objects.

Strangely, when these objects were seen optically no one took spectra in order to see what they actually were. Finally a paper appeared in a refereed Journal [3] where the authors showed the spectra of two of them to be that of high redshift quasars! Just to cement the case they looked at previously identified quasar in or close to galaxies and in 24 out of 24 cases the quasars belonged to the class of Ultra Luminous X-ray Sources.

2) This result is a double disaster in that the massive Black Holes turned out to be high redshift quasars, not a Black Hole in a binary star. Perhaps worse, they have been accepted as members of nearby galaxies and therefore

cannot be out at the edge of the universe. Bye bye Big Bang and all that fundamental physics. (This result was not put out as a press release.)

What was put out recently as a press release was the observation of X-ray outbursts at the center of a galaxy. This was heralded as gas spinning around a Black Hole.[4] This is the classical interpretation of + and - redshifts as orbital velocities instead of opposite ejection velocities. I noticed they say the photons go "down in frequency" (translation: they are redshifted) by climbing out of the gravitational hole. If so, the lines would be smeared out by gravitational gradients. It sounds to me like good old fashioned intrinsic redshifts.

Ironically, the galaxy is a well known, very active galaxy called NGC 3516. Previously published results [5], reprinted here in Fig. 1, show apparently ejected X-ray sources are really high redshift quasars. Perhaps those quoted in the news story should consider whether they have instead observed ejection of new quasars which are evolving into new galaxies as they travel outward.

Ever more recent press releases report the finding in cosmic microwave backgound radiation, of cooler spots about one degree radius around supposedly very distant galaxy clusters.[6] One of the authors was quoted as saying "Our results may ultimately undermine the belief that the Universe is dominated by a cold dark matter particle and even more enigmatic dark energy." Well that is standard closing for many press releases. But seriously, the 1 degree radius agrees with observed quasar families evidentially being ejected from active parent galaxies. [6] and example in Fig.1 here. How does this connect?

Ejections from Black Holes are hypothesized to come about when a star or other object falls splat against the surface of a black hole (or accretion disk). But whole quasars and proto galaxies which evolve into normal galaxies out of the fraction that escapes coherently are too much to ask for. Hence the rejection of Ambarzumian's observational conclusion around 1959 that new galaxies were born out of old galaxies. And thus leading to the importance of ejection of low particle mass seed galaxies which also accounts for the high redshifts.[7] It would be natural to think that nearby cool spots on the sky as large as the 1 degree radius observed have something to do with the associations of nearby parent galaxies with evolving quasars and galaxies.

But to get down to the fundamental assumptions involved, I remember an Astrophysics lunch at Cal Tech about 30 years ago. Stephen Hawking sat across the table from several of us who were discussing observations of

ejection of new galaxies from the compact nuclei of active galaxies. Nothing of this ever crept into Hawking's assumptions about Black Holes. Only very recently has he abandoned his dictum that nothing comes out of Black Holes and famously now concedes that a "little bit" does come out. Meanwhile, in the many intervening years, stunning new evidence has emerged on the White Hole propensities of nature. Its only failure I can see is not getting into the press releases.

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Notes

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