



Written by [James Heiser](#) on January 23, 2013

Deep Space Discovery Challenges Assumptions of Homogeneous Universe

A recent deep space discovery is calling into question scientific assumptions that have been taken for granted for generations. The scale of one Large Quasar Group (LQG) is massive — in fact, scientists estimate its size at approximately four billion light years across. But even more significantly, it also appears to be unique, and thus fundamentally challenges the assumption that the universe is homogeneous, lacking any substantial variation in observable phenomena wherever one may happen to look.



According to an article for Reuters, researchers from Britain's University of Central Lancashire published their discovery in the *Monthly Notices* of the Royal Astronomical Society earlier this month. According to the society, "Since 1982 it has been known that quasars tend to group together in clumps or 'structures' of surprisingly large sizes, forming large quasar groups or LQGs." Quasars are the brightest known objects in the universe, and thus the existence of such large clusters of quasars is a matter of particular interest to scientists. But the scale of an LQG which is so massive that it is 1,600 times larger than the distance between our galaxy and its nearest neighbor — Andromeda — is so massive that scientists were unprepared for its existence. Reuters quotes the statement issued by Roger Clowes, the leader of the research team: "While it is difficult to fathom the scale of this LQG, we can say quite definitely it is the largest structure ever seen in the entire universe. ... This is hugely exciting — not least because it runs counter to our current understanding of the scale of the universe."

Modern science was ill-prepared for the discovery of a "structure" that is four billion light years across because its seemingly unique character defies the "cosmological principle" — an assumption first enunciated by Isaac Newton in 1687 that maintains that there are no "special places" in the universe. In the [words of astronomer William Keel](#):

The cosmological principle is usually stated formally as "Viewed on a sufficiently large scale, the properties of the Universe are the same for all observers." This amounts to the strongly philosophical statement that the part of the Universe which we can see is a fair sample, and that the same physical laws apply throughout. In essence, this in a sense says that the Universe is knowable and is playing fair with scientists.

The problem is the recently discovered LQG is not "playing fair with scientists." As [Chris Gayomali wrote for TheWeek.com](#) concerning the cosmological principle:

According to the [principle](#), if you gaze out into the universe from any point (say, [this potentially inhabitable exoplanet](#)), then space should look consistent no matter the direction from which you're looking.

But the Huge-LQG throws a colossal monkey wrench into the theory: The object is simply too big,



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too unusual a shape to fit neatly into the homogenized lines of the cosmological principle. It could mean our little corner of the cosmos — or at least what we can see of it — is exceptional. Unusual, even. [Speaking with *The Atlantic*](#), study lead Roger G. Clowes at the University of Central Lancashire explains that the cosmological principle “seemed plausible, but it’s never been demonstrated beyond reasonable doubt.”

In fact, the cosmological principle was never proven because its truth was simply assumed. If the universe is not homogeneous, then significant variations may indeed be recognized as exceptional. For example, the cosmological principle has been used to simply assume that there is a uniformity to the whole universe that necessitates the widespread distribution of life, not only on Earth, even in the absence of evidence for the existence of such life. Simply taking the cosmological principle for granted, those who would challenge the assumption that life is a widespread phenomenon may find themselves denigrated for their scientific obscurantism, and the absence of evidence has been declared insufficient to undermine the assumption of its uniform existence throughout the universe.

Now, the Huge-LQG is a four-billion-light-year-wide challenge to the assumption of the cosmological principle. The lackadaisical assumption of homogeneity is being called into question, and science will be the better for such a challenge based on the data which Clowes’ team has observed.



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