

Queen's astronomers propose new supernova interpretation

June 9 2009

In a controversial new paper in the journal *Nature*, astronomers from Queen's University Belfast have proposed a new physical interpretation of a supernova discovered on 7th November 2008.

A group of researchers, led by Dr. Stefano Valenti from Queen's University Belfast, found a weak explosion that is unusual in many ways, and several lines of evidence suggest it could be from a massive star.

This goes against mainstream thinking in the astrophysics community which believes that this type of supernova comes from old white dwarf stars (low-mass stars) in binary systems.

The supernova in question SN2008ha was a faint explosion that contained no hydrogen.

In their paper however, Valenti and his colleagues propose that the peculiar spectrum and faint luminosity of the supernovae in question, SN2008ha, more closely resembles those supernovae associated with the death of [massive stars](#) when their core collapses.

The key difference with the other faint explosion of massive stars was the lack of hydrogen which is usually detected in underluminous Supernovae.

Dr Valenti said "SN2008ha is the most extreme example of a group of supernovae that show similar properties. Up until now the community

had thought that they were from the explosion of [white dwarfs](#), which we call type Ia supernovae. Those are the ones that have been used to measure the geometry of the distant Universe and infer the existence of [dark energy](#). But we think SN2008ha doesn't quite fit this picture and appears physically related to massive stars"

Professor Stephen Smartt from Queen's added "This is still quite controversial, we have put this idea forward and it certainly needs to be taken seriously.

"The implications are quite important. If this is a massive star explosion then it is the first one that might fit the theoretical models of massive stars that lose their outer layers through their huge luminosity pressure and then, perhaps, collapse to [black holes](#) with a whimper".

Dr Valenti's team is keen to use new deep, time resolved surveys of the Universe to find more of these and test their ideas. One such experiment is the first of the Pan-STARRS telescopes that has started surveying the sky in the last month.

The supernova in question was found in the galaxy UGC12682 in the constellation Pegasus by American school girl Caroline Moore, a member of the Puckett Observatory Supernova Search team.

It was immediately recognized by professional astronomers as quite unique, as it was one of the faintest explosions of its type ever discovered, with an energy approximately 50 times smaller than usual. This is the equivalent of converting several earth masses completely into energy.

Source: Queen's University Belfast

Citation: Queen's astronomers propose new supernova interpretation (2009, June 9) retrieved 4 May 2024 from <https://phys.org/news/2009-06-queen-astronomers-supernova.html>

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