Celestial firework marks nearest galaxy collision

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Colour image of the collision, made by combining the CTIO H-alpha image with red and blue images. Credit: Ivan Bojicic / the scientific team.

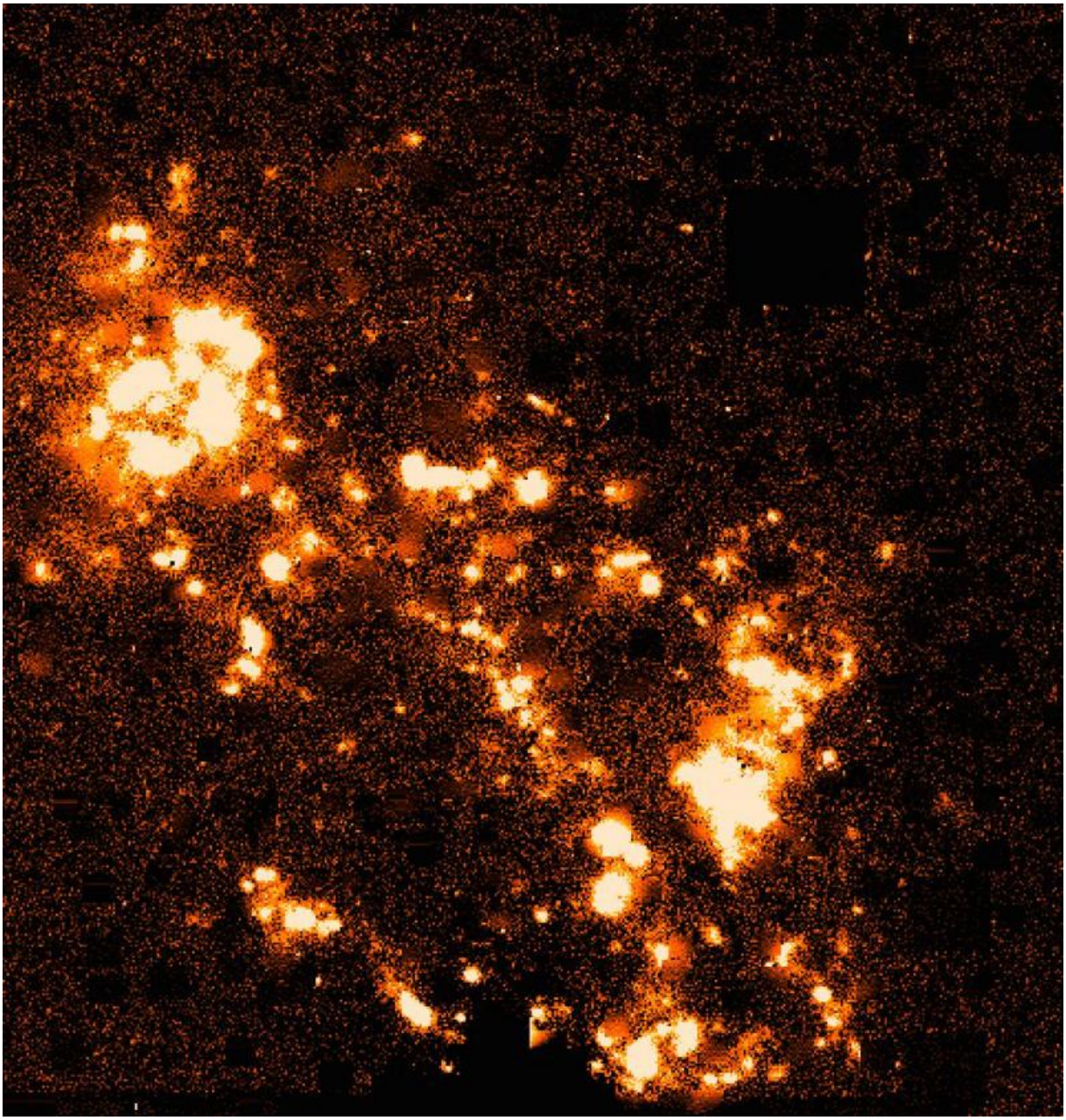
A spectacular galaxy collision has been discovered lurking behind the Milky Way. The closest such system ever found, the discovery was announced today by a team of astronomers led by Prof. Quentin Parker at the University of Hong-Kong and Prof. Albert Zijlstra at the University of Manchester. The scientists publish their results in *Monthly Notices of the Royal Astronomical Society*.

The galaxy is 30 million light years away, which means that it is relatively close by. It has been dubbed "Kathryn's Wheel" both after the famous firework that it resembles, but also after the wife of the paper's second author.

Such systems are very rare and arise from "bulls-eye" collisions between two galaxies of similar mass. Shockwaves from the collision compress reservoirs of gas in each galaxy and trigger the formation of new stars. This creates a spectacular ring of intense emission, and lights up the system like a Catherine wheel firework on bonfire night.

Galaxies grow through collisions but it is rare to catch one in the process, and extremely rare to see a bull's-eye collision in progress. Fewer than 20 systems with complete rings are known.

Kathryn's Wheel was discovered during a special wide field survey of the Southern Milky Way undertaken with the UK Schmidt Telescope in Australia. It used a narrow wavelength optical region centred on the so-called red "H-alpha" emission line of gaseous hydrogen. This rare jewel was uncovered during a search of the survey images for the remnants of dying stars in our Milky Way. The authors were very surprised to also find this spectacular cosmic ring, sitting remotely behind the dust and gas of the Milky Way in the constellation of Ara (the Altar).



Residual image of the collision, made by subtracting the red image from the CTIO H-alpha image, which mostly cancels the contributions from normal stars and is effective in highlighting just the areas of active star formation. Credit: Quentin Parker / the scientific team

The newly discovered ring galaxy is seven times closer than anything similar found before, and forty times closer than the famous 'Cartwheel' galaxy. The ring is located behind a dense star field and close to a very bright foreground star, which is why it had not been noted before. There are very few other galaxies in its neighbourhood; the odds of a collision in such an empty region of space are very low.

Professor Parker said "Not only is this system visually stunning, but it's close enough to be an ideal target for detailed study. The ring is also quite low in mass – a few thousand million Suns, or less than 1% of the Milky Way – so our discovery shows that collision rings can form around much smaller galaxies than we thought."

Professor Zijlstra added "It is not often that you get to name any objects in the sky. But I think Kathryn's Wheel is particularly fitting, resembling as it does a firework and continuing the tradition of naming objects after loved ones."

Smaller galaxies are more common than large ones, implying that collisional rings could be ten times as common as previously thought. The authors intend to carry out more detailed studies on larger telescopes since the discovered galaxy is currently the only one of its kind close enough to permit study in such exquisite detail.

More information: "Kathryn's Wheel: a spectacular galaxy collision discovered in the Galactic neighbourhood." *MNRAS* (October 01, 2015) Vol. 452 3759-3775 DOI: 10.1093/mnras/stv1432 First published online August 16, 2015

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