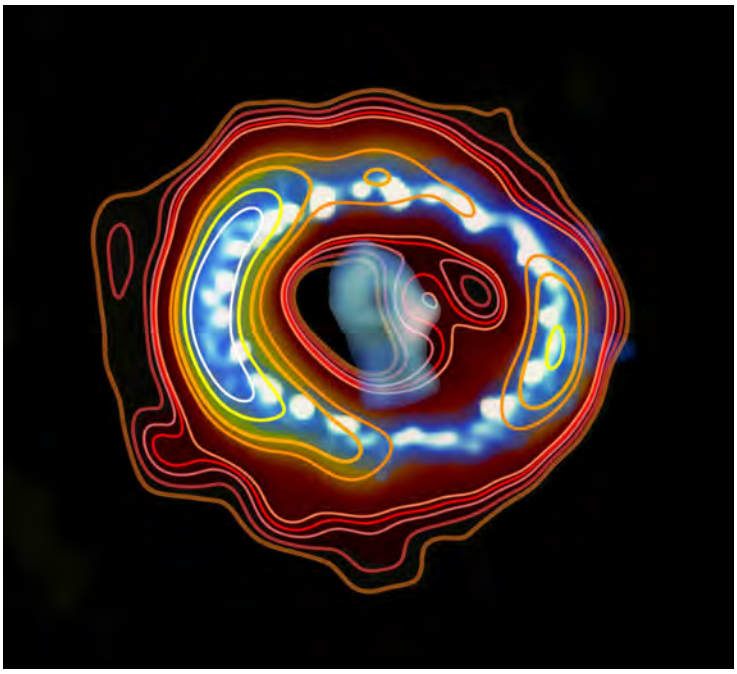
This date in science: Supernova 1987A

Supernova 1987A first appeared in earthly skies 30 years ago on the night of February 23-24. It was the closest observed supernova since Johannes Kepler's Nova in 1604. Kepler thought he saw the birth of a new star. Today, of course, we know we're not watching the birth of a star, but the death of one.

Astronomers in 1987 were beside themselves with delight. In this shining pinpoint in our sky, those fortunate to be in Earth's Southern Hemisphere (in whose sky the supernova appeared) could see the death throes of a giant star. The new star remained visible to the eye for many months. It has been studied by astronomers for decades since, as one of the brightest stellar explosions since the invention of the telescope more than 400 years ago.



A Red/Green/Blue overlay of optical, X-Ray and radio observations made by 3 different telescopes. In red are the 7-mm (44GHz) observations made with the Australian Compact Array in New South Wales, in green are the optical observations made by the Hubble Space Telescope, and in blue is an X-ray view of the remnant, observed by Nasa's space based Chandra X-ray Observatory

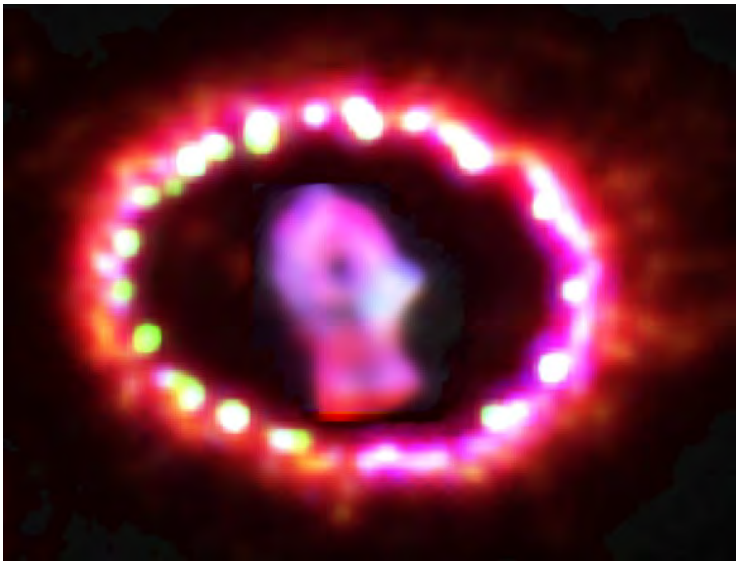
The explosion itself occurred some 160,000 years ago, on the outskirts of the Tarantula Nebula in the Large Magellanic Cloud – a nearby dwarf galaxy. Its brightness peaked in May, 1987 when it appeared as a moderately bright star in our sky. Afterwards, it slowly declined in brightness.

It was the first opportunity for modern astronomers to see a supernova up close, so to speak. Observations since then of Supernova 1987A have provided much insight into these fascinating objects.

Astronomers in Australia and Hong Kong suggest that a compact source (neutron star?) or 'pulsar wind nebula' is sitting in the centre of the radio emission.

What was Supernova 1987A? Now known as a Type II Supernova, 1987A is a violent stellar event, caused by the explosion and subsequent collapse of a star. In this case, the progenitor – the star that exploded so spectacularly – was Sanduleak -69° 202, a blue supergiant.

Given the size of the original star, astronomers would have expected a neutron star to form. Neutrino emissions from the supernova event indicate that a compact object did form at the star's core. To this day, though, although astronomers have searched for the neutron star left behind by the supernova, no neutron star has been found.



This is a Hubble Space Telescope image. The Space Telescope has been observing this object since its launch in 1990, three years after the supernova exploded

Why care about supernovae? There are some good reasons!

1. We are made of stardust. Supernovae are the mechanism by which the atoms created in stars are released into space; the same atoms that make up our bodies and all that we know.
2. Their high-energy radiation affects how life evolves. It effects the evolution of life on Earth.
3. A cosmic trigger to the formation of planetary systems. There is intriguing evidence that a supernova triggered the formation of our own solar system, Earth and the other planets
4. They serve a Standard Candles in the measure of the Cosmos, beyond the distance that normal stars can be observed

For all these reasons and more, astronomers want to know what makes supernovae explode, and what happens after they do.

AK, with EarthSky and Wikipedia Note