

Offered Title: Supernova Salad

Just like a salad, the ingredients and conditions for a supernova are varied. But what about the basic 'nova'? Seems it doesn't get any respect (it's not super).

Super or not, it's a nova or "new" star that seems to appear in the heavens.

16th century astronomer Tycho Brahe coined the term "*nova stella*", new star, as he documented his observations of the supernova of 1572 in Cassiopeia. He also observed that this nova did not move in the sky like the planets, and suggested it was farther in distance.

So, a nova appears to be a new star, but the irony is most novae come from old stars, white dwarfs. We'll deal with that later, it's a classification thing.

A nova usually does not involve exploding. A star that goes nova does so because it is having unstable fusion events, causing ejection of some mass with the star remaining intact. This ejection of mass causes the star to brighten considerably, sometimes from invisible to bright in our sky. A common cause is where a white dwarf star (very old) has a red giant star companion. If they are close enough the white dwarf can strip off some of the red giant's hydrogen atmosphere. Over time this hydrogen accumulates on the white dwarf and a fusion flash occurs, making the white dwarf much brighter temporarily (days, months, sometimes years). This process can be repeated. These types of novae are detected several times per year. Another, but less frequent scenario is the sudden fusion of a helium shell around a white dwarf. First proposed in 1989, they are called 'helium novae' and only about 5 have been observed since 2000.

Supernovae on the other hand do explode and the host star is either destroyed or only the core remains. Walter Baade and Fritz Zwicky coined the term supernova in 1931 to separate them from standard novae.

Supernovae come in several flavors within major classifications (currently I-V). Type I and II are the most common supernova types.

Type Ia, where a white dwarf star has a close companion star, is the most common. This sound familiar? See nova. Unlike the nova scenario, hydrogen from the other star collects on the white dwarf until it undergoes runaway fusion! This destroys the white dwarf, and its companion might or might not survive, but surely is changed. The remnant is a vast cloud of debris.

Type II supernovae are core collapse events in stars greater than 8 times the mass of our Sun. There are numerous variants based on star mass and spectrographic observations, but the same principle remains. The remnant can be a vast cloud of debris, or a neutron star, basically the surviving core of this massive star.

What's in the Sky?

July 3&4; dusk; west-northwest, low; Use Binoculars: A waxing Crescent Moon is visible with Mercury, Mars, Castor, and Pollux. The Beehive star cluster is upper left of Mars.