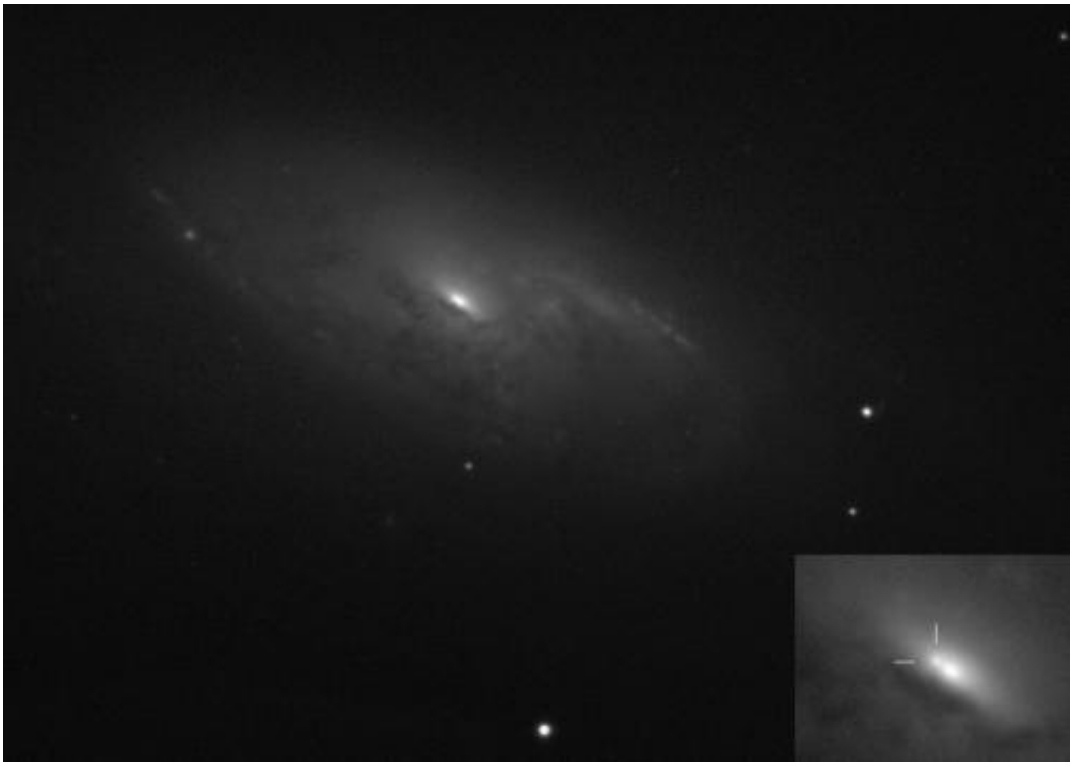
New supernova pops in bright galaxy M106 in the 'Hunting Dogs'

May 23 2014, by Bob King



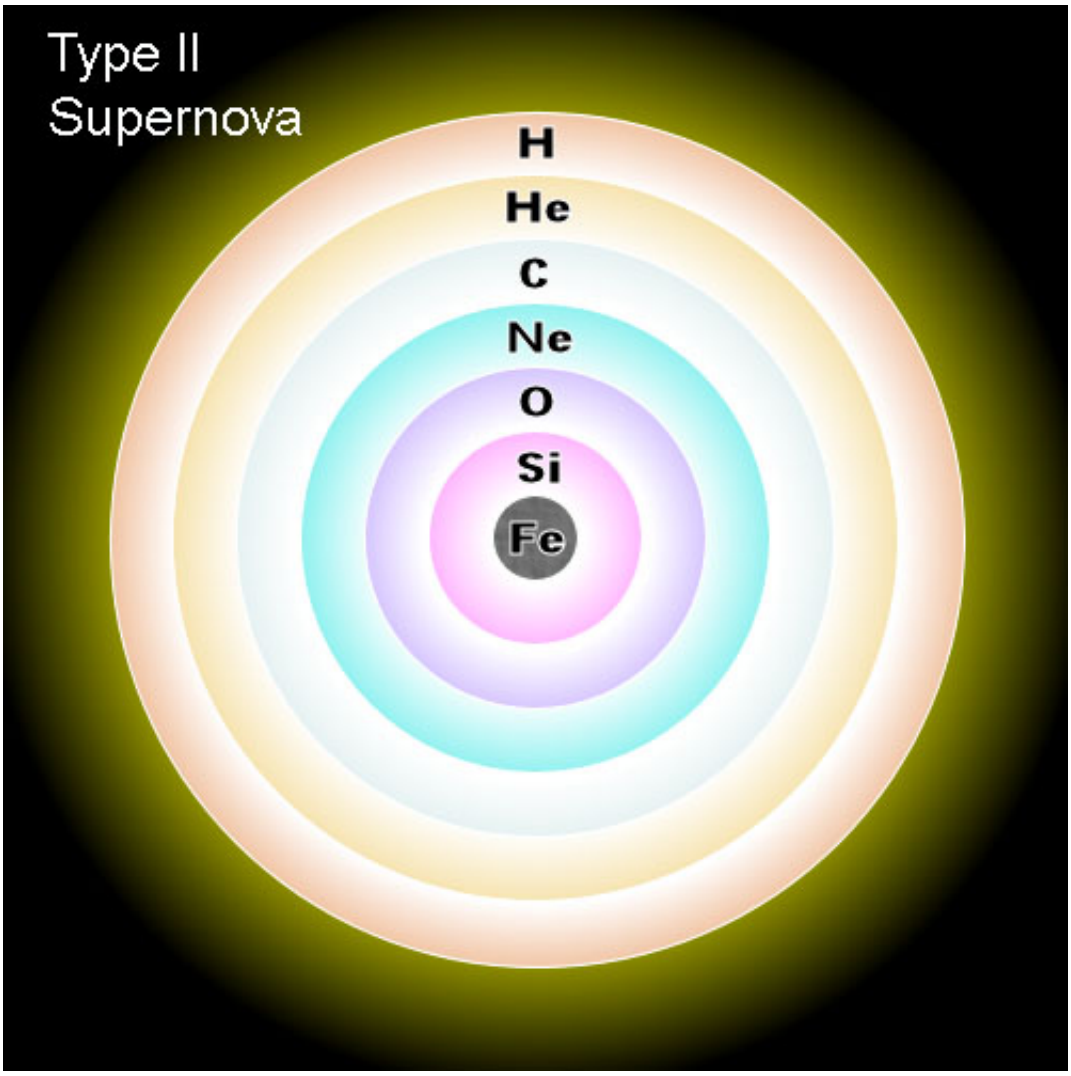
The new supernova with the temporary name of PSNJ12185771+4718113 nestles right up to the nucleus of the galaxy in this photo taken May 21 with a 17-inch telescope. It's just 1″ east and 3″ south of galactic center. Credit: Gianluca Masi, Francesca Nocentini and Patrick Schmeer

A supergiant star exploded 23.5 million years ago in one of the largest and brightest nearby galaxies. This spring we finally got the news. In April, the Katzman Automatic Imaging Telescope (KAIT) as part of the

Lick Observatory Supernova Search, photographed a faint "new star" very close to the bright core of M106, a 9th magnitude galaxy in Canes Venatici the Hunting Dogs.

A study of its light curve indicated a Type II supernova – the signature of a rare supergiant star ending its life in the most violent way imaginable. A typical supergiant star is 8 to 12 times more massive than the sun and burns at a much hotter temperature, rapidly using up its available fuel supply as it cooks lighter elements like hydrogen and helium into heavier elements within its core. Supergiant lifetimes are measured in the millions of years (10-100 million) compared to the frugal sun's 11 billion years. When silicon fuses to create iron, a supergiant reaches the end of the line – iron can't be fused or cooked into another heavier element – and its internal "furnace" shuts down. Gravity takes over and the whole works collapses in upon itself at speeds up to 45,000 miles per second.

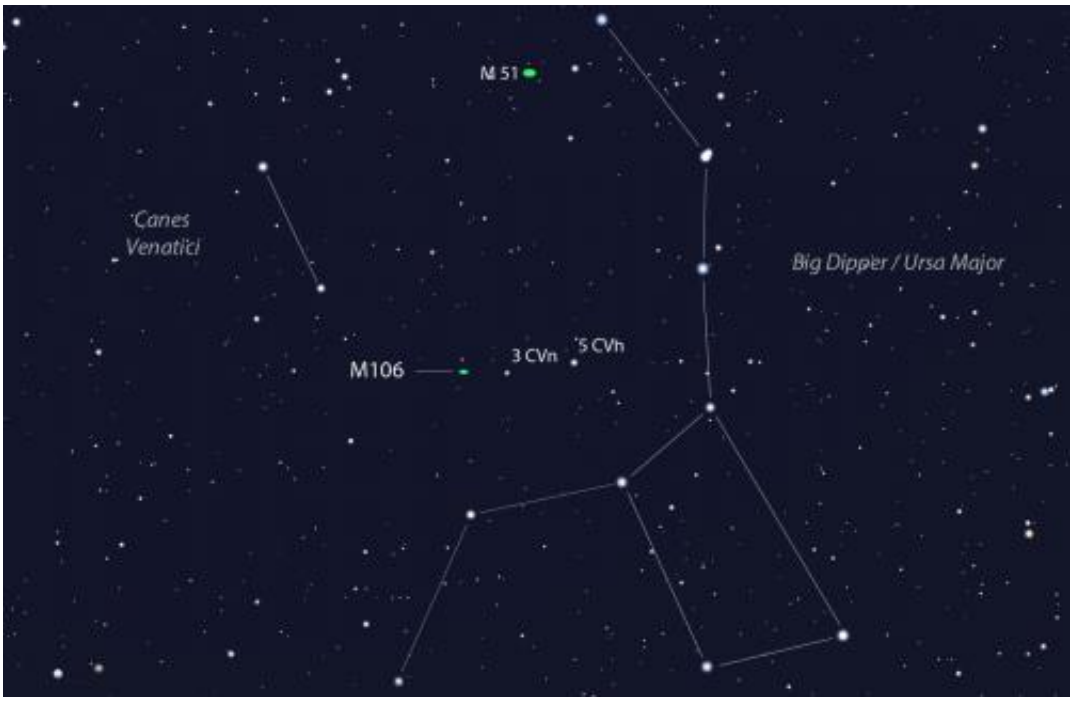
When the outer layers reached the core, they crushed it into a dense ball of subatomic particles and send a powerful shock wave back towards the surface that rips the star to shreds. A supernova is born! Newly-minted radioactive forms of elements like nickel and cobalt are created by the tremendous pressure and heat of the explosion. Their rapid decay into stable forms releases energy that contributes to the supernova's light.



The inner core of a red or blue supergiant moments before exploding as a supernova looks like an onion with multiple elements “burning” through the fusion process to create the heat and pressure that stays the force of gravity. Fusion stops at iron. With no energy pouring from the central core to keep the other elements cooking, the star collapses and the rebounding shock wave tears it apart.

For two weeks, the supernova in M106 remained pinned at around magnitude +15, too faint to tease out from the galaxy's bright, compact nucleus for most amateur telescopes. But a photograph taken by

Gianluca Masi and team on May 21 indicate it may have brightened somewhat. They estimated its red magnitude – how bright it appears when photographed through a red filter – at +13.5. A spectrum made of the object reveals the ruby emission of hydrogen light, the telltale signature of a Type II supernova event.



At magnitude +9, M106 visible in almost any telescope and easy to find. Start just above the Bowl of the Big Dipper which stands high in the northwestern sky at nightfall in late May. The 5th magnitude stars 5 CVn (5 Canes Venatici) and 3 CVn lie near the galaxy. Star hop from the Bowl to these stars and then over to M106. Stars plotted to mag. +8.

Visually the supernova will appear fainter because our eyes are more sensitive to light in the middle of the rainbow spectrum (green-yellow) than the reds and purple that bracket either side. I made a tentative observation of the object last night using a 15-inch (37-cm) telescope

and hope to see it more clearly tonight from a darker sky. We'll keep you updated on our new visitor's brightness as more observations and photographs come in. You can also check Dave Bishop's Latest Supernovae site for more information and current images.

This Hubble Space Telescope image shows how spectacular M106 truly is. Dark filaments of dust are silhouetted against billions of unresolved suns. Young star clusters rich with hot, blue stars and tufts of pink nebulosity swaddling newborn stars ornament the galaxy's spiral arms. A supermassive black hole rumbles at the heart of the galaxy. M106 is the 106th entry in Charles Messier's famous catalog created in the 18th century. It's located 23.5 million light years away. Credit: NASA / ESA

Even if the supernova never gets bright enough to see in your telescope,

stop by M106 anyway. It's big, easy to find and shows lots of interesting structure. Spanning 80,000 light years in diameter, M106 would be faintly visible with the naked eye were it as close as the Andromeda Galaxy. In smaller scopes the galaxy's bright nucleus stands out in a mottled haze of pearly light; 8-inch(20-cm) and larger instrument reveal the two most prominent spiral arms. M106 is often passed up for the nearby more famous Whirlpool Galaxy (M51). Next time, take the detour. You won't be disappointed.

Source: Universe Today