

## SEMINAIRE régulier du Service d'Astrophysique



### The SuperNova SN 1987A: 20 years After.

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11h00

SN 1987A, the brightest supernova in 383 years, just turned 20. Few events in modern astronomy have met with such an enthusiastic response by the scientists and now, after 20 years, it continues to be an extremely exciting object that is further studied by astronomers around the world. Indeed, SN 1987A has been a bonanza for Astrophysics, and it has triggered a huge upsurge in studies of supernovae of all types. It has been observed at all wavelengths, from gamma-rays and neutrinos to the radio spectrum, for only a multi-wavelength approach can shed some light on the underlying physics in such an extreme environment. As it is morphing into the youngest ever observed supernova remnant, a balance sheet will be presented. SN 1987A provided many “firsts”: it was the first Type II recorded in an irregular galaxy, the first supernova (i) whose progenitor was identified, (ii) from which neutrinos have been detected (marking the core collapse), (iii) to be detected in gamma-rays, (both line and continuum emission), (iv) to provide evidence for dust condensation in the ejecta, and the prompt intrinsically faint radio burst was the first of its kind. Still, many questions remain unanswered despite the diligent efforts at observation and analysis which I will summarize: How did the enigmatic three rings form? Did the progenitor belong to a binary system? Precisely what took place in the core during the collapse and bounce? Is a black hole or a neutron star left behind in the debris? The morphology and luminosity of the incipient supernova remnant are at present rapidly changing at all wavelengths, as the blast wave from the explosion expands outward, while a reverse shock is propagating inward. A violent encounter is now underway between the fastest-moving debris and the circumstellar material left by mass loss from the progenitor star. We are in particular witnessing, for the first time on dynamical time scales, the ongoing destruction of the dust. The inner debris of the explosion itself, still excited by radioactive isotopes produced in the explosion, are now resolved. Recent results will be discussed and a forecast of what can be expected for the next 20 years will be proposed. I will show that future observations promise to be quite as exciting as the ones carried out up to now!



Un café sera servi 15 minutes avant le séminaire

**Ce séminaire aura lieu au CEA Saclay – Orme des Merisiers – bâtiment 709, Salle 220.**