

New findings on the birth of the solar system

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A team of international astrophysicists, including Dr Maria Lugaro from Monash University, has discovered a new explanation for the early composition of our solar system.

The team has found that radioactive nuclei found in the earliest meteorites, dating back billions of years, could have been delivered by a nearby dying giant star of six times the mass of the [sun](#).

Dr Lugaro said the findings could change our current ideas on the origin of the [solar system](#).

"We have known about the early presence of these radioactive nuclei in meteorites since the 1960s, but we do not know where they originated from. The presence of the radioactive nuclei has been previously linked to a nearby [supernova explosion](#), but we are showing now that these nuclei are more compatible with an origin from the winds coming from a large dying star," Dr Lugaro said.

The conclusion was reached by combining stellar observations from telescopes with recently developed theoretical models reproduced on powerful computers of how stars evolve and which nuclear reaction occurs within their interiors.

"We need to know if the presence of radioactive nuclei in young planetary systems is a common or a special event in our galaxy because their presence affected the evolution of the first large rocks (the parent bodies of asteroids and meteorites) in the solar system. These are

believed to be the source of much of earth's water, which is essential for life," Dr Lugaro said.

"Within one million years of the formation of the solar system the radioactive nuclei decayed inside the rocks where they were trapped, releasing high-energy photons, which caused the rocks to heat. Since much of earth's water is believed to have originated from these first rocks, the possibility of life on earth depends on their heating history and, in turn, on the presence of radioactive nuclei." Dr Lugaro said.

"What we need to do now is investigate the probability that a dying giant star could have actually been nearby our then young solar system and polluted it with radioactive nuclei. This will inform us on the place where the solar system was born, on the probability that other young planetary system also are polluted with radioactive nuclei, and, eventually, on the probability of having water on terrestrial planets in other planetary systems."

More information: The findings have been published in the journal *Meteoritic & Planetary Science*.

Source: Monash University ([news](#) : [web](#))

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