

# The abundance of elements and pre-solar grains

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The abundance of elements in the Universe is not that easy to know. A large part of the constraints we have on stellar nucleosynthesis are coming from analyses of extraterrestrial material. We will see how it is possible from the analysis of rare meteorites to deduce the average composition of non-volatiles elements present in the protoplanetary disk that surrounded the young Sun.

A first part of the lecture will be dedicated to review the different types of extraterrestrial materials available in laboratories. What are their parent bodies ? What can be deduce from these samples ? What is a primitive sample? We will emphasis the crucial importance of solar system small bodies (i.e. asteroids and comets) as archives of the composition of the early solar system. We will detail the average abundance of elements of the local interstellar medium 4,5 Gyrs ago that can be deduced from the composition of a specific class of meteorites, the carbonaceous chondrites.

A second part of the lecture will be dedicated to pre-solar grains that are mineral phases that condensed in stellar envelopes in generations of stars prior the formation of the Sun. I will detail the different type of pre-solar grains, how they where first found and what do they tell us about stellar nucleosynthesis ?

The last part of the lecture will be devoted to the issue raised by the presence of short lived radioactivities in the accretion disk that surrounded the young Sun. We will see what these radioactivities may tell about the astrophysical context of the solar system birth and the possibility to draw a frontier between interstellar heritage and processes that occurred within the first millions years following the gravitational collapse of the Sun.