

Colloquium

SFB 956

Conditions and Impact of Star Formation

26.10.2015 | supplementary colloquium

Monday 3:00 pm

Physikalische Institute Köln

Lecture Hall III

Zülpicher Straße 77 | 50937 Köln

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What can we Learn from Presolar Grains about the Age of the Universe?

The synthesis of the chemical elements can be divided into two phases. First, the very short Big Bang Nucleosynthesis lasting less than one hour. The resulting matter consisted almost exclusively of hydrogen and helium. The birth of the first stars about 500 million years after the Big Bang marked the onset of the production of the heavier elements. Since then, more and more heavy elements are produced in different astrophysical processes.

The results of these processes can be observed in the abundance distribution of the solar system. In particular presolar grains found in meteorites are an extremely valuable source of information, since they are formed in single stars. The abundance distribution of the isotopes in these grains reflects the conditions inside the stars they are originating from.

Additional valuable information are imprinted in the abundance of long-lived radioactive nuclides. These nuclides act as tracers and record the history of the universe. It is therefore possible to constrain the time since the beginning of the nucleosynthesis and hence the age of the universe. A necessary condition is the knowledge of the underlying nuclear reaction rates under stellar conditions with sufficient precision. A promising example is the nuclear decay of ^{87}Rb . However, the production of ^{87}Rb is strongly influenced by the neutron capture rate of ^{85}Kr , which is only poorly known. Over the course of the next years, the stellar neutron capture cross section of ^{85}Kr will therefore be investigated within the ERC funded project NAUTILUS.

