Contribution ID: **80** Type: **Oral Presentation**

The radiogenic heating of planets and the 40K question

The quantity of radioactive isotopes in a planet's mantle and the evolution of its heating due to the isotopes' radioactive decay determines the capability of that planet to develop geological features associated with a habitable environment, such as surface crust and plate tectonics. When our solar system was formed, large quantities of Potassium (K), a major element available in the interstellar medium at the time, got subsequently deposited inside our planet's mantle and crust. Potassium's long-lived radioactive isotope ^{40}K is still present in large quantities inside the planet. The beta particles that it emits heat up earth's mantle for the last several billions of years and largely contribute to the habitable nature of Earth. Predicting the amount of ^{40}K enrichment in the solar system of a given exoplanet would be fundamental for a reliable calculation of the planet's heating evolution and would allow us to make estimates on the likely existence of a habitable environment. Potassium, however, has a complex production and (destruction) mechanism in the cosmos. From a nucleosynthesis point of view, the uncertainty in the abundance of ^{40}K is associated with the reactions that create and destroy 40K in stellar nucleosynthesis processes and the corresponding reaction rates. In my talk, I will discuss the importance of potassium in the context of exoplanet-related research, the origin of potassium in stars, the nuclear physics aspects that affect the existence of ^{40}K, and current experimental efforts to constrain the relevant reaction rates.

Length of presentation requested

Oral presentation: 25 min + 5 min questions (Review-type talk)

Please select between one and three keywords related to your abstract

Nuclear physics - experimental

2nd keyword (optional)

Nucleosynthesis

3rd keyword (optional)

Habitability, Exoplanets

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