



Contribution ID: 25

Type: **not specified**

Ultra-low radioactivity, a new frontier for biology (Remote talk)

Wednesday 17 January 2024 11:04 (20 minutes)

Everywhere there is life, there is radioactivity. Indeed, radioactivity is at the heart of every living organism thanks in particular to the presence of potassium 40 with a 1.248 billion years half life and a 0.1167% isotopic fraction. The role radioactivity may have played in the emergence and evolution of life on earth is still a matter of debate. Is the recent discovery in Gabon of multicellular organisms dated 2.1 billion years ago a few kilometers from the Oklo natural nuclear reactors only a mere coincidence or is there a correlation between these two currently unique events in the history of the earth ?

Models for radiation risk in humans have existed for decades. However, there are still debates about what happens at low doses. The currently accepted model of the radiation dose-damage relationship for organisms is the linear no-threshold (LNT) model, which predicts a positive linear correlation between dose and damage that intercepts at zero dose corresponding to zero damage.

Deep Underground Laboratories are unique places to explore the relevance of the LNT model and to challenge its relevance when radioactivity is reduced 10 to 1000 times compared to levels of background radiation typically found in terrestrial surface environments.

The talk will summarize the state of the art of the radiation biology programs currently running in Underground laboratories around the world and propose some directions for a research program at PAUL.

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Session Classification: Ultra-low radioactivity and Radiobiology