Contribution ID: **170** Type: **Oral**

Paleo-Detectors for Galactic Supernova Neutrinos

Tuesday, 3 December 2019 14:30 (20 minutes)

Paleo-detectors are a proposed experimental technique in which one would search for traces of recoiling nuclei in ancient minerals. Natural minerals on Earth are as old as 1 Gyr and, in
many minerals, the damage tracks left by recoiling nuclei are also preserved for time scales long compared to 1Gyr once created. Thus, even reading out relatively small target samples of order 100g, paleo-detectors would allow one to search for very rare events
thanks to the large exposure, 100gGyr=105tyr. Here, we explore the potential of paleo-detectors to measure nuclear recoils induced by neutrinos from galactic core collapse supernovae. We find that they would not only allow for a direct measurement of the average core collapse supernova rate in the Milky Way, but would also contain information about the time-dependence of the local supernova rate over the past 1 Gyr. Since the supernova rate is thought to be directly proportional to the star formation rate, such a measurement would provide a determination of the local star formation history. We investigate the sensitivity of paleo-detectors to both a smooth time evolution and an enhancement of the core collapse supernova rate on relatively short time scales, as would be expected
for a starburst period in the local group.

Primary author: Dr STENGEL, Patrick (Stockholm University)

Presenter: Dr STENGEL, Patrick (Stockholm University)

Session Classification: Parallel

Track Classification: Neutrinos