Contribution ID: **1048** Type: **Parallel session talk**

Investigating the possibility of leakage detection in water distribution networks using cosmic ray neutrons in the thermal region

Thursday 18 July 2024 18:15 (15 minutes)

Water distribution systems can experience high levels of leakage, causing financial losses, supply problems, as well as being a risk for public health.
In this talk we present a non-invasive water leakage detection technique based on cosmic ray neutrons, that exploits the difference in the above ground thermal neutron flux between dry and wet soil conditions. The potential of the technique has been assessed by means of an extensive set of Monte Carlo simulations based on GEANT4, involving realistic scenarios based on the Italian aqueduct design guidelines.
Simulation studies focused on sandy soils and results suggest that a significative signal, associated with a leakage, could be detected with a data-taking lasting from a few minutes to a half-hour, depending on the environmental soil moisture, the leaking water distribution in soil, and the soil chemical composition.
The design of a portable and low-cost detector, suitable for this kind of applications, is also presented.

Alternate track

I read the instructions above

Yes

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