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BOOK OF ABSTRACTS

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Comparison of indoor radon measurement methods

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Radon is the radioactive gas originating from the decay chain, mainly uranium and thorium series. The main source of population exposure to ionizing radiation (more than 80 %) is the natural radioactivity. Radon and its short lived progeny contribute with more than 50 % to the radiation dose received by the general population from all sources, and the World Health Organization has recognized radon as the second most important cause of lung cancer.

The European Council has laid down a basic safety standards (BSS, Council Directive 2013/59/Euratom) for the protection against the dangers arising from exposure to ionizing radiation, obliging member states, among other, to investigate the exposure of members of the public and workers to indoor radon, to develop a radon action plan and to inform the public about radon levels they are exposed to. As a consequence, this has led to increased number of indoor radon measurements in recent years.

There are numerous methods for indoor radon measurement which can be performed either by direct measurement of radon or indirectly by measuring radon progeny, with or without radon presence. The choice of method used depends on the purpose of the measurements, available instrumentation and time.

In order to assess the reliability of indoor radon measurement methods available in "Vinca" Institute of Nuclear Sciences, comparative measurement were conducted. Indoor radon concentration was measured in four working rooms in Vinca Institute, two offices and two laboratory premises, in the period of October-November 2020. In all locations continuous radon measurements were performed with tree different active measurement devices: RTM1688-2 and Radon Scout from SARAD GmbH, and RadonEye from RadonFTLAB, while integrated radon measurements were conducted with charcoal canisters. In addition, Equilibrium Equivalent Radon Concentration EERC was measured with radon progeny monitor RPM2200 (SARAD GmbH). Measurement by all active devices was performed simultaneously and lasted around 4 days with 1 hour sampling time, while measuring time for charcoal canisters was 2 days. In one office and one laboratory measurements were repeated and six sets of results were obtained.

Very good agreement between results obtained by active devices was observed, with correlation ranging from 0.72 - 0.98. A certain discrepancy was observed between averaged radon concentration from active devices and results from charcoal canisters only in one office.

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