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Material assay campaign of the DarkSide-20k experiment

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The DarkSide-20k experiment will search for dark matter in the form of WIMPs and has the potential to set the best limits for the spin-independent interaction of heavy WIMPs with nucleons. The background requirement of this experiment is less than 0.1 events in 200 tonne years, which is the most stringent one ever set so far in the field of rare event searches and establishes rigorous requirements in terms of radiopurity of the detector materials.
A thorough assay campaign has been running for five years to assess the radiopurity of candidate components, paying particular attention to the U and Th decay chains. Different assay techniques have been adopted to be sensitive to the chain parents (ICPMS), the gamma emitters through the chain (HPGe), and the often ignored Po-210 content in the bulk of the materials. In such a way, it is possible to systematically investigate the secular equilibrium of the decay chain in all the materials. A specific mass spectrometry campaign has been added to the radioassay campaign to find out the chemical composition of the critical components of the detector, minimizing the uncertainty of the neutron yield produced through (a,n) reactions.
In this talk, we present the organization of the assay campaign and its results to date.

Primary author: PESUDO, Vicente (CIEMAT / Lab. Sub. Canfranc)

Presenter: PESUDO, Vicente (CIEMAT / Lab. Sub. Canfranc)

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