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DarkSide 20-k Material Assay Campaign

Basing on the successful operation of the DarkSide-50 detector, the DarkSide Collaboration is now constructing DarkSide-20k, a direct WIMP search detector utilizing a two-phase Liquid Argon Time Projection Chamber (LArTPC). With a rejection factor for discrimination between electron and nuclear recoils in LAr of >3×10ˆ9, use of the veto system and utilizing silicon photomultipliers in the LAr TPC, DarkSide-20k will have a sensitivity to WIMP-nucleon cross sections of 1.2×10ˆ-47 cmˆ2 (1.1×10ˆ-46 cmˆ2) for WIMPs of 1 TeV/cˆ2 (10 TeV/cˆ2) mass, to be achieved during a 5 y run. To maintain the background goal of less than 0.1 events (other than neutrino-induced nuclear recoils) in the WIMP search region, DarkSide-20k must be built with special care to the construction process and materials in use. In order to achieve this goal, a dedicated working group (Materials Assay Working Group) was formed within the Collaboration. In the talk, the organization of the materials assay process, the means to manage the records of the results (database) and evaluate the expected background (neutron background budget), and assay techniques utilized to scrutinize the construction materials will be described in detail.

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