

Directional Dark Matter Detection with MIMAC

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In order to perform Directional DM detection, low energy nuclear recoil tracks have to be detected. The MIMAC collaboration has recently reported the first detection of 3D nuclear tracks coming from the Radon progeny confirming the possibility to perform this kind of measurement with an ionization quenching measurement on these heavy nuclei. The nuclear recoils produced by monochromatic neutron fields have been detected by a MIMAC chamber, allowing the experimental determination of the electron-nuclear recoil discrimination at the same time that the angular distribution of the Fluorine recoils produced by the neutron elastic collision has been experimentally described.

A new facility called COMIMAC has been developed at the LPSC (Grenoble) to perform the 3D characterization of nuclear tracks of known kinetic energies. The first measurements performed by the Sino-French MIMAC collaboration will be reported showing clear differences with respect to the best simulation available.

We also report here the implementation of the measure of the signal induced on the cathode by the motion of the primary electrons toward the anode in a MIMAC chamber. As a validation, we performed an independent measurement of the drift velocity of the electrons in the considered gas mixture, correlating in time the cathode signal with the measure of the arrival times of the electrons on the anode.

We will also say few words about the status of the m3 detector based on MIMAC cells which will be installed in Modan underground laboratory as well as about the ongoing effort to build the next generation directional Dark Matter detector : Cygnus.

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