

Design of low energy calibration sources for liquid xenon dark matter detectors.

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XMASS experiment is ongoing at Kamioka observatory in Japan, and purposes mainly for dark matter search using 835kg liquid xenon as target.

Energy spectrum of nuclear recoil signal is expected to decrease exponentially.

As lower energy threshold as possible is strongly needed for dark matter search to check stability of detector in low energy region.

There is a prior study on low energy X-ray compact sources using characteristic X-ray from Al(1.5keV), Ti(4.5keV) excited by 5.9keV X-ray from Fe-55 and so on.

[M.C.LEPY et. al., Appl. Radiat. Isot. Vol.43, No.7, p847-851, 1992]

With this method, calibration source below 5.9keV can be created.

We are studying feasibility of low energy X-ray sources using characteristic X-ray from Al(1.5keV) and Sc(4.1keV) with ability to be used in liquid xenon.

The main challenge is the design of the window withstanding the pressure of xenon (up to 2atm) while transmitting low energy X-rays (down to 1.5keV).

The principle, feasibility and design of these sources will be reported.

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