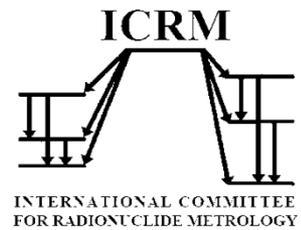


# Radon removal system for the LZ Dark Matter experiment

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- ▶ Radon ( $^{222}\text{Rn}$ ) is resupplied continuously from warm parts of the LZ LXe dual phase TPC detector into the fiducial volume.
- ▶ The beta decay of its daughter  $^{214}\text{Pb}$  (b.r.11%) may end up in the dark matter energy window and survive the S2/S1 nuclear recoil discrimination cut in the analysis.
- ▶ Of Rn isotopes abundant in nature, only  $^{222}\text{Rn}$  ( $T_{1/2} = 3.8$  days) is of concern.
- ▶  $^{222}\text{Rn}$  dissolves in LXe and cannot be removed with hot gas purifying getters.
- ▶ We have designed and fabricated a prototype radon removal system to study  $^{222}\text{Rn}$  adsorption and radon breakthrough time through activated charcoal traps in different carrier gases ( $\text{N}_2$ , Ar and Xe) and at various temperatures of the traps.
- ▶ Clearly, the ultimate goal of these studies is to learn how we can trap  $^{222}\text{Rn}$  efficiently until it decays away.

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