

# Continuous measurement of radon exhalation rate from the soil surface around an active volcano

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- ▶ The  $^{222}\text{Rn}$  exhalation rate from soil surface was measured together with meteorological data in order to discuss the possibility of the prediction of volcanic activity.
- ▶ The  $^{222}\text{Rn}$  exhalation rate was measured using the flow-through method.
- ▶ The  $^{222}\text{Rn}$  exhalation rate showed its maximum value after rainfall.
- ▶ The daily variation of the  $^{222}\text{Rn}$  exhalation rate and  $\text{CO}_2$  concentration seem to be in good agreement. Thus,  $^{222}\text{Rn}$  will become a good tracer for  $\text{CO}_2$  monitoring in environment.
- ▶ However, no relation between the  $^{222}\text{Rn}$  exhalation rate and volcanic activity has been found in this study due to the effect of rainfall. Thus, it is necessary to develop a correction method for the effect of rainfall on the  $^{222}\text{Rn}$  exhalation rate obtained by the flow-through method.

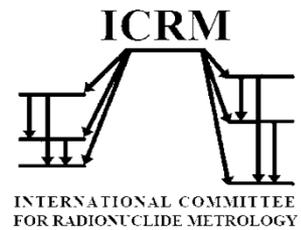
## Presentation # 91



# 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.

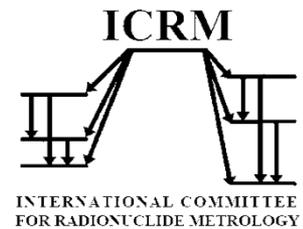
Presentation # 123



# Improved Pressurized Marinelli Beaker Measurements of Radioactive Xenon in Air

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- ▶ A carbon composite Marinelli beaker for compressed air samples was fabricated for use with a co-axial HPGe detector
  - Pressures up to 4000 psi
  - Contains approximately 0.4 m<sup>3</sup> at pressure
- ▶ Counting efficiencies and MDC were determined using <sup>131m</sup>Xe (163 keV), <sup>133</sup>Xe (81 keV), and <sup>135</sup>Xe (249 keV)
  - MDC (24 hr assay): <sup>131m</sup>Xe = 13; <sup>133</sup>Xe = 1.4; <sup>135</sup>Xe = 0.35 Bq/m<sup>3</sup>
- ▶ A 4x performance improvement was observed over previous aluminum Marinelli beaker design

Presentation # 164



## When the mean value does not mean what is really happening: The case of indoor radon concentration measured with track detectors in workplaces

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- ▶ Great variations of indoor radon concentrations are observed
- ▶ Integrated radon monitors are not indicated in working places in some cases
- ▶ Continuous monitoring for radon is preferable in working places, if possible
- ▶ A proposal for actuation with radon measurement in working places is presented

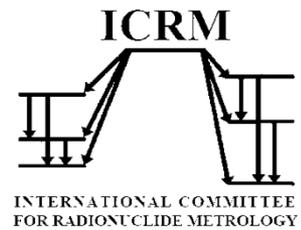
### Presentation # 46



# Natural radon reduction rate of the Community Groundwater System in South Korea

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- ▶ CGS is one of groundwater supply systems for rural and mountainous areas where access to the nationwide water work is not convenient.
- ▶ So far there are more than 7,000 CGS in South Korea.
- ▶ 28.8 % of the CGS exceed 100 Bq/L, WHO guideline (2011) and 17.5 % exceed 148 Bq/L, AMCL (alternative maximum contaminant level) by US EPA (2012).
- ▶ Measured radon concentrations of groundwater and tank water from 13 CGS.
- ▶ Tank waters showed a wide reduction rate of radon varying from -17.9 to 63.3 % with an average of 26.5 %.
- ▶ Applying the radon reduction rate of 26.5 % to the nationwide CGS, the proportion of high radon level above 100 Bq/L and 148 Bq/L decreases from 28.8 % to 22.0 % and from 17.5 % to 13.2 %, respectively.

## Presentation # 49

