



Contribution ID: 206

Type: Poster

## Radioactivity measurements of $^{238}\text{U}/^{232}\text{Th}$ for JUNO acrylic and LAB by ICP-MS

*Monday, 3 July 2023 15:30 (1 hour)*

The Jiangmen Underground Neutrino Observatory (JUNO) is a multi-purpose neutrino experiment that was proposed primarily to determine neutrino mass ordering. The center detector is a 35.4m diameter spherical acrylic vessel containing 20 kton low background Liquid Scintillator (LS). The radioactive requirements are 10-12g/g and 10-17g/g of  $^{238}\text{U}/^{232}\text{Th}$  for JUNO acrylic and LS, respectively.

The accurate measurement of  $^{232}\text{Th}/^{238}\text{U}$  in acrylic and LAB, which is the main component of LS, is significant for JUNO. To improve the detection sensitivity of ICP-MS, we developed two different pretreatment techniques for acrylic and LAB. For acrylic, the pretreatment is dry ashing with a microwave muffle furnace. For LAB, the pretreatments are distillation then acid extraction or ashing. Combining the pretreatment techniques and ICP-MS, we improved the sensitivity of  $^{238}\text{U}/^{232}\text{Th}$  measurement in acrylic to 10-13 g/g, and the preliminary results show that the upper limit of  $^{238}\text{U}/^{232}\text{Th}$  in LAB can reach 10-16 g/g. The  $^{238}\text{U}/^{232}\text{Th}$  measurements played an important role in the mass production, surface treatment procedure optimization of JUNO acrylic as well as several LAB samples screening before and after JUNO LS purification systems. In this poster, the detail of  $^{238}\text{U}/^{232}\text{Th}$  measurement approaches and screening results will be presented.

**Primary author:** LI YUANXIA, 李院霞 (高能所)

**Presenter:** LI YUANXIA, 李院霞 (高能所)

**Session Classification:** Poster session & Coffee break