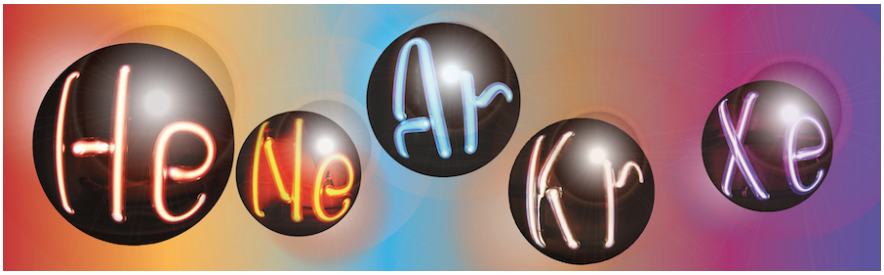

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Noble gas impurities suppression in PandaX-4T by the distillation method

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In recent years, liquid xenon detectors have played a crucial role in dark matter searches and neutrino physics. However, noble gas impurities such as krypton, argon and radon contribute significantly to electron backgrounds in these detectors. The PandaX-4T experiment recently reported its WIMP search results based on a 1.54 tonne-year exposure, where radon accounted for approximately half of the background events.
To mitigate this issue, the latest data-taking campaign employed the online distillation process, successfully suppressing the radon background to a level of 3 μBq/kg. Additionally, the online krypton distillation process reduced the argon concentration by more than an order of magnitude. In this talk, I will present the methods and results of impurity reduction in the PandaX-4T experiment, focusing on the effectiveness of the online distillation technique.

Primary author: 崔, 祥仪 (上海交通大学)

Presenter: 崔, 祥仪 (上海交通大学)

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