Contribution ID : **341** Type : **Oral talk**

# Optimization of detector structure based on flow field numerical simulation with the assistance of artificial intelligence

*Thursday, 29 October 2026 17:05 (15)*

In order to improve the circulation purification efficiency of the PandaX-xT dark matter detector and efficiently achieve the ultra-trace background required by the detector through flow field optimization, this study conducts CFD numerical simulations of the xenon flow field based on the structure of the PandaX-4T detector. The multi-variable simulation results are introduced into an artificial intelligence (AI) framework, to establish a mapping relationship between the parameters and performance metrics for investigating the flow field characteristics, and completing the structural optimization of the detector. Finally, the flow field simulation is updated based on the optimized parameters. The effectiveness of the optimization scheme in improving flow uniformity and reducing impurity accumulation are analyzed, which could provide guidance and optimization directions for the performance enhancement of large-scale liquid xenon dark matter detectors.

**Primary author(s) :** WANG, Haoyu

**Co-author(s) :** WANG, Zhou (Shanghai Jiao Tong University)

**Presenter(s) :** WANG, Haoyu

**Session Classification :** Artificial Intelligence in particle physics and astrophysics

**Track Classification :** Artificial Intelligence in particle physics and astrophysics