Contribution ID: **111** Type: **01** - 分会报告

Experiment on Detecting Migdal Effect in Neutron Scattering Based on Gas Pixel Detectors

Thursday, 9 May 2024 18:05 (15 minutes)

The sensitivity threshold for dark matter detection via nuclear recoil typically resides within a few keV, rendering the region below this threshold inaccessible to the detector. However, theoretical calculations suggest that recoiling nuclei possess a low probability of transferring energy to outer-shell electrons exceeding their recoil kinetic energy, termed the Migdal effect. The Migdal effect holds promise in extending dark matter detection to lower energy ranges for probing lower-mass dark matter particles, albeit this effect remains unobserved in nuclear recoil events. This report presents our experiment on neutron scattering Migdal effect detection utilizing gas pixel detectors. In comparison to existing Migdal detection experiments, our detector boasts conservative trajectory imaging (~100 μm vertex resolution), satisfactory energy resolution (19% @ 5.9 keV), and time resolution capabilities, alongside relatively high detection efficiency. The report offers detailed insights into the detector's structure, performance, data analysis algorithm flow, background simulation, measurement outcomes, as well as the experimental progress and future plan.

Collaboration (if any)

Primary authors: Prof. LIU, Hongbang (广西大学); LI, jin; 刘, 倩 (中国科学院大学); 易, 涤凡 (中国科学院大学); 郑, 阳恒 (中国科学院大学)

Presenter: 易, 涤凡 (中国科学院大学)

Session Classification: 02 - 暗物质直接/间接探测实验

Track Classification: 02 - 暗物质实验: 02-1 - 暗物质直接/间接探测实验