

Executive Summary

This report shows the performance of the half of KM2A in LHAASO, including the pointing error, the angular resolution, the long-term stability, and the absolute energy scale of the primary cosmic-ray particles, by the observed cosmic-ray Moon shadow. By calculating the displacement of the Moon shadow with different declination, we also give the pointing error of the array between about $\pm 25^\circ$ declination which is very important for the position of the 12 ultra-high energy gamma sources observed by half of KM2A in LHAASO.

Through this report, we summarize the following results:

- The pointing accuracy for the north and south direction is $0.02^\circ \pm 0.01^\circ$;
- The angular resolution from the Moon shadow is in agreement with that from the simulation. At 13TeV, the angular resolution equals about 0.7° ;
- The relationship between the displacement of the Moon shadow along the east and west direction and Nfit is also calculated to satisfy $(0.60 \pm 0.19)N_{\text{fit}}^{(0.36 \pm 0.08)}$;
- The detector is very stable through monitoring the position of the Moon shadow, and the angular resolution variance as time goes by;
- The accuracy of the detector for the position of the source on different declination bands is the same.

There are still some limitations in this report, including : These results of the performance need to involve the simulation of Moon shadow absolute energy scale of the primary particle which we didn't cover and explore in depth.