Executive Summary

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For ISS-CREAM detector, the ultimate goal of the energy calibration is to change the ADC to MeV. This is done by beam test at CERN using 150 GeV electron beams. The energy deposit to each ribbon's beam response, is estimated in the Monte Carlo simulation, and with that, the calibration factor on each ribbon is generated with comparing the ADC from beam test measurement and MeV from the Monte Carlo simulation.

However, the existence of attenuation effect on each ribbon makes the calibration factor imprecise. The calibration factor is in dependent on the position of the beam test. In order to solve this problem, additional corrections to the calibration factor are made, including attenuation corrections and gain corrections.

After attenuation correction, the energy deposit distribution along each ribbon in each layer is checked, and it shows the distributions with attenuation correction is flat, which implies the distributions are independent of the beam position. The similar checking are done along five ribbons, as well as summing over the deposits on all the ribbons in the total twenty layers, and they are both in dependent of the beam position.

The energy response fraction is determined by summing over all calorimeter ribbon energy deposits and dividing by the known beam test incident energy, and with that, the incident energy of a primary particle can be determined through its energy response. The energy responses for various electron energies, pion energies are shown.

In sum, with the calibration method. We are confirmed that the energy

responses are linear for electron beams with a energy range from 50 GeV to 175 GeV and pion beams with an energy range from 250 GeV to 350 GeV. These were available beams for the detector calibration at CERN, but the linearity of measurement energy range can be further validated with the heavy-ion beam test and MC simulation results. The method of the attenuation correction introduced this paper are being used for flight data analysis.