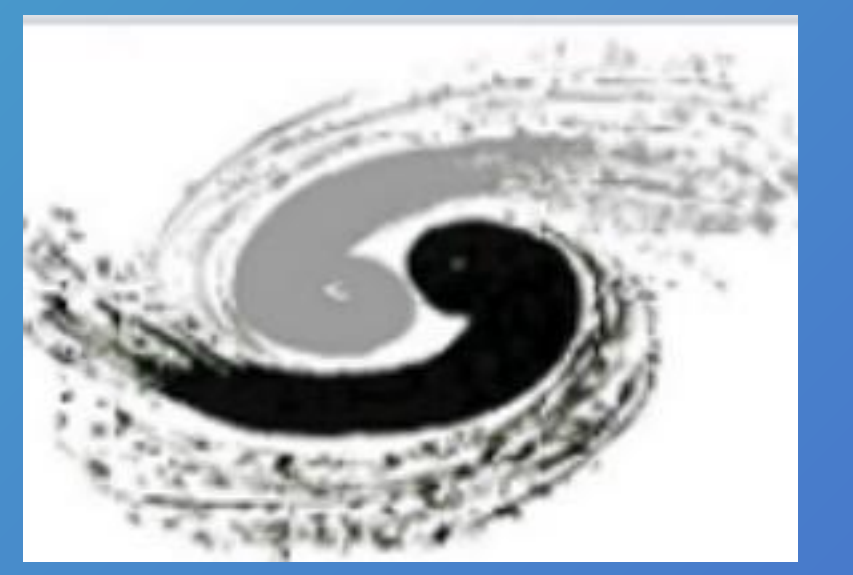




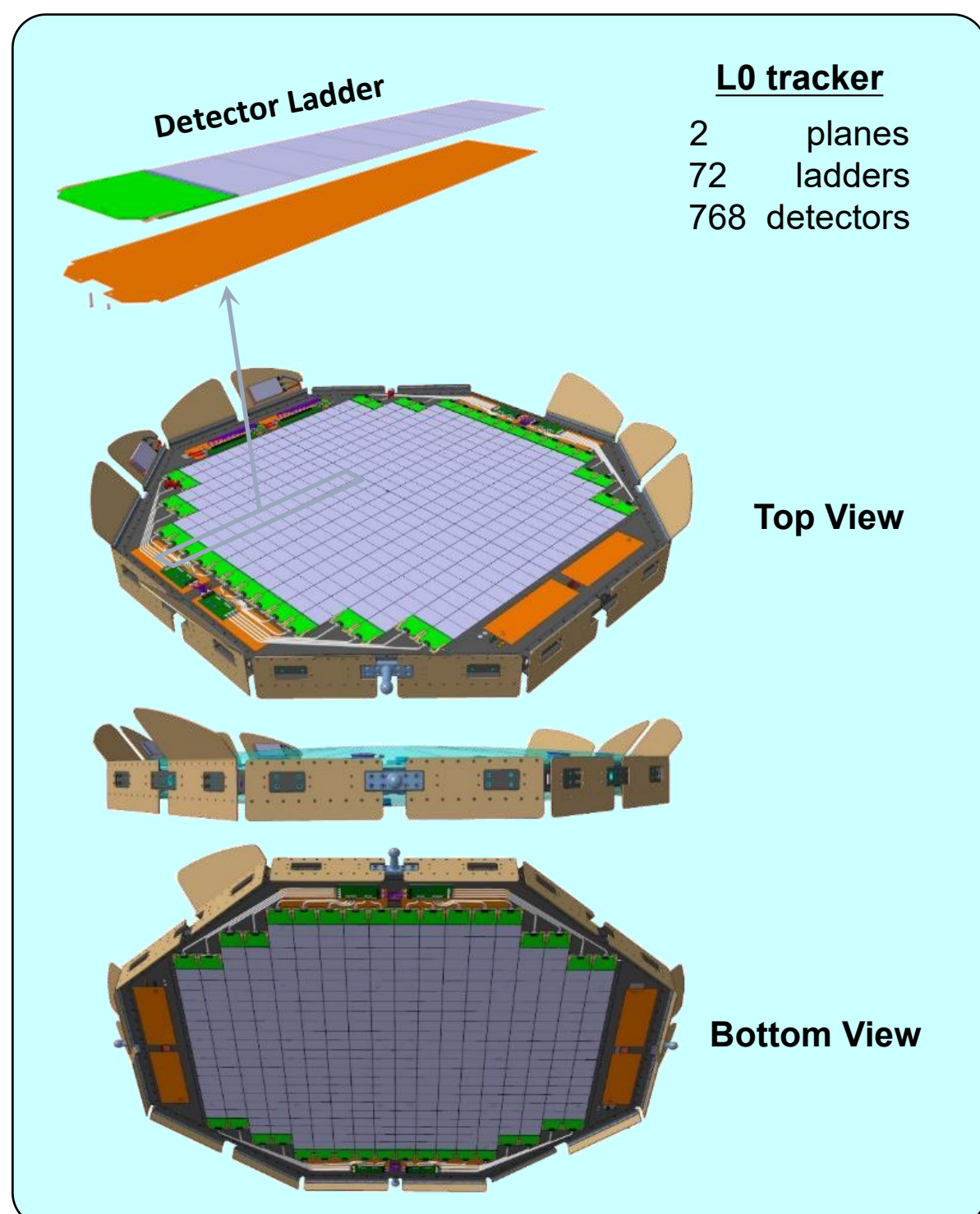
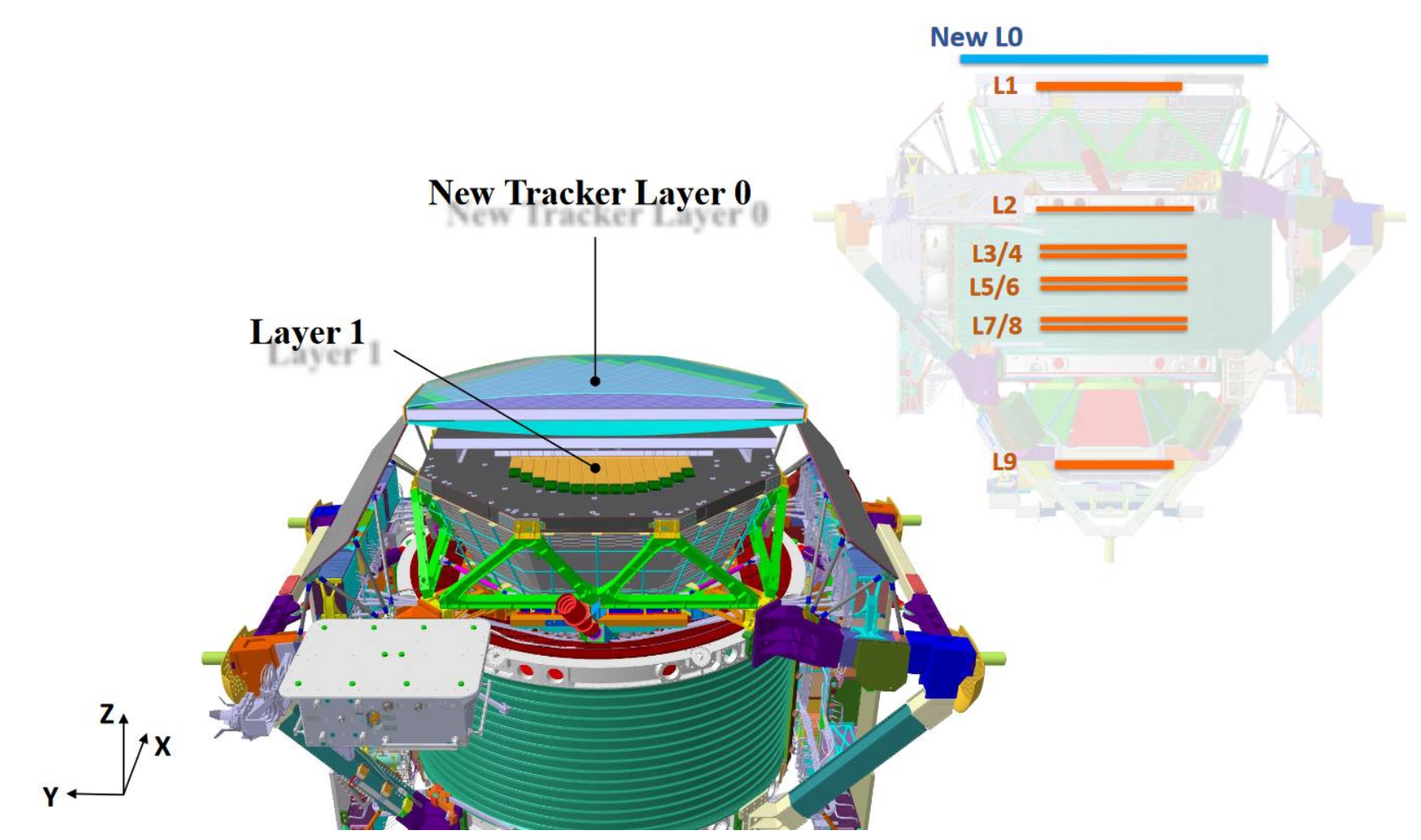
AMSLO Ladder Production

Qinze Li (李沁泽) on behalf of AMSLO team
Institute of High Energy Physics, CAS

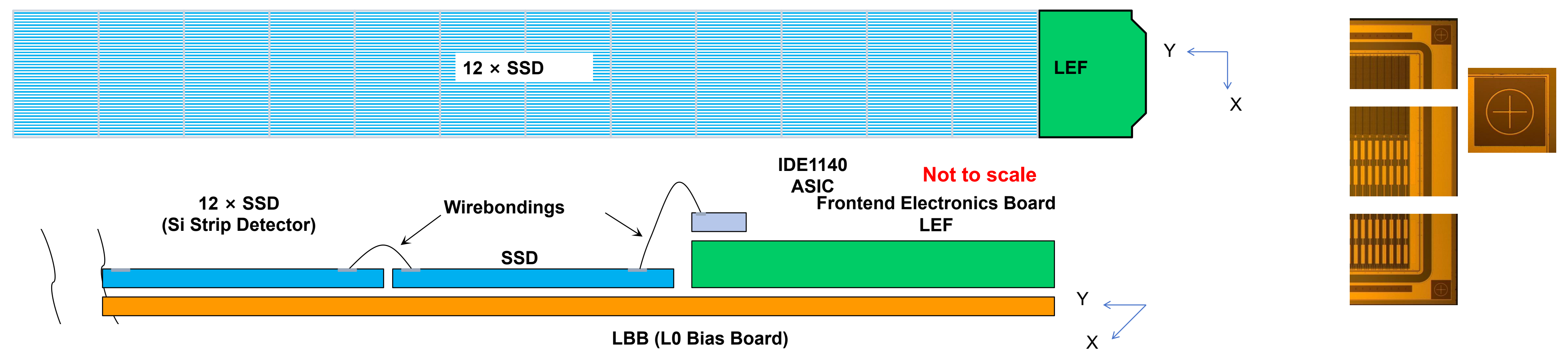


AMS-02 and L0 upgrade

AMS is a multipurpose particle physics detector installed on the International Space Station. The objective of the experimental includes search of dark matter, the primordial anti-matter, and the origin and propagation of cosmic rays. AMS-02 detector has a large acceptance and is designed to provide precise measurement of charged cosmic rays. Components of the detector include: a silicon tracker, four planes of TOF scintillation counter, a transition radiation detector, a ring imaging Cherenkov detector, an electromagnetic calorimeter, and permanent magnet.

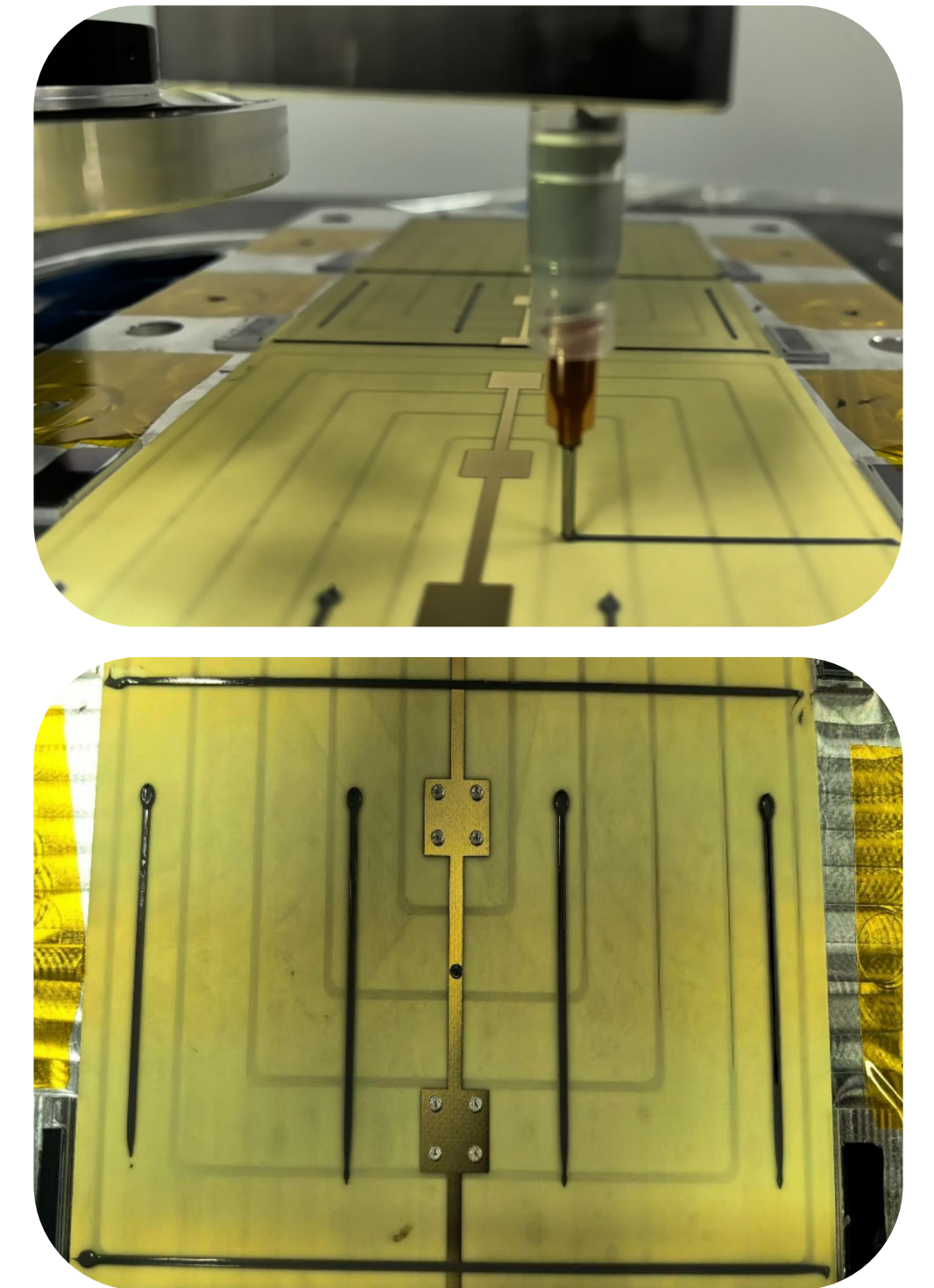
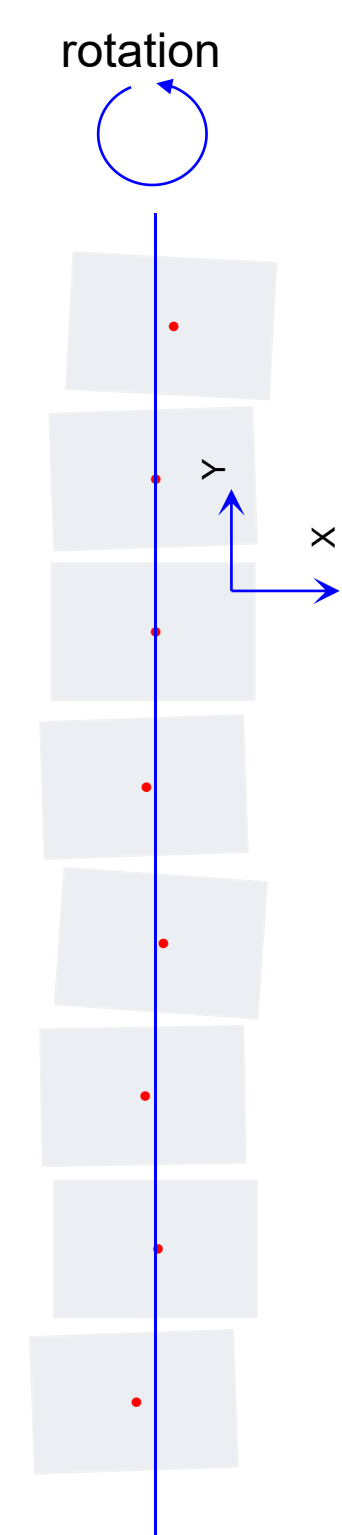
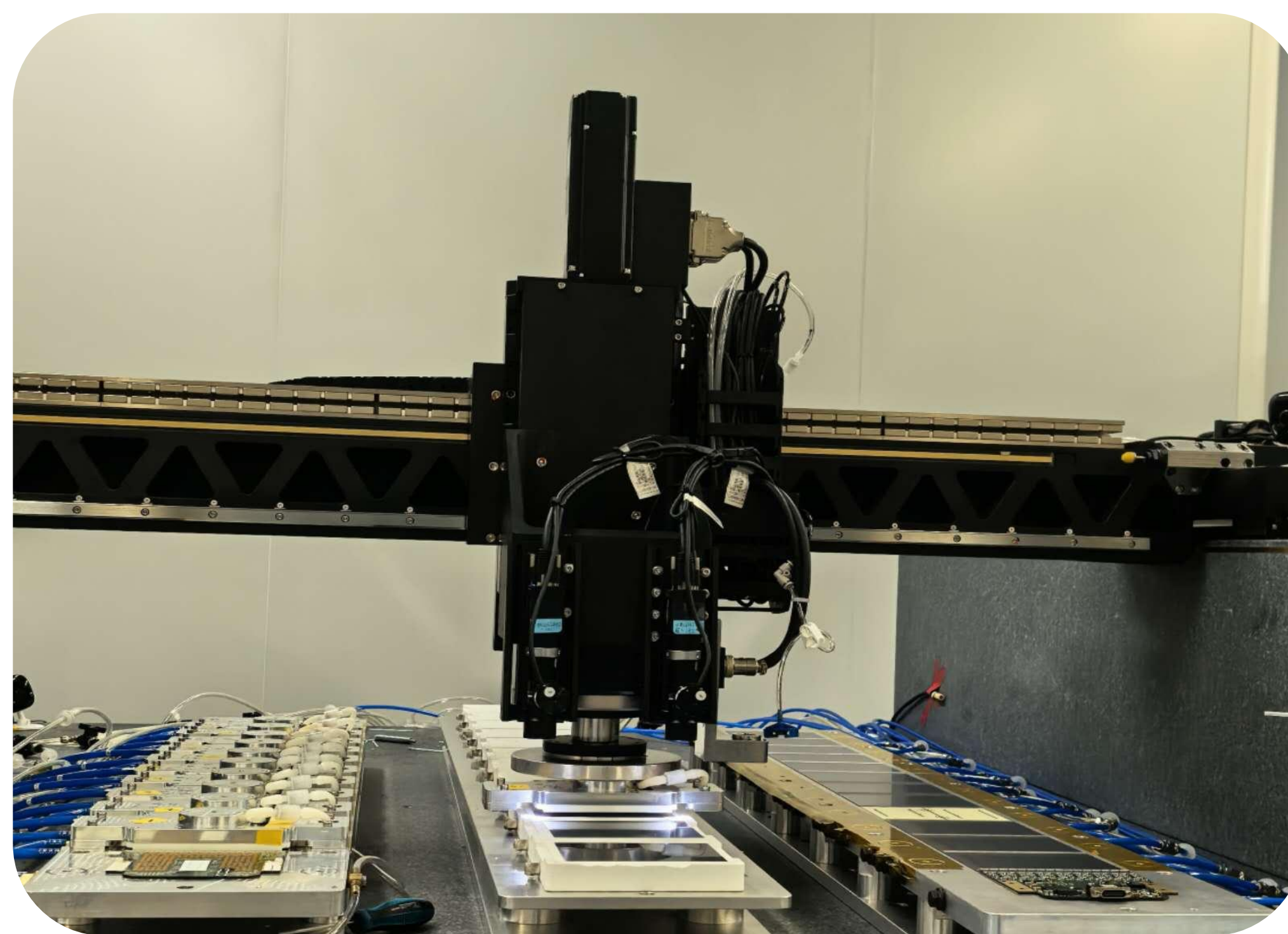


AMSLO increases the acceptance of cosmic rays by 300% and significantly improves the ability of identifying heavy ions. The L0 layer has two planes, each consists of in total 36 ladders of three different types: 8, 10, 12-SSD(Si Strip Detector). The main responsibility of IHEP is to produce all 72 high quality ladders.(Si Strip Detector)



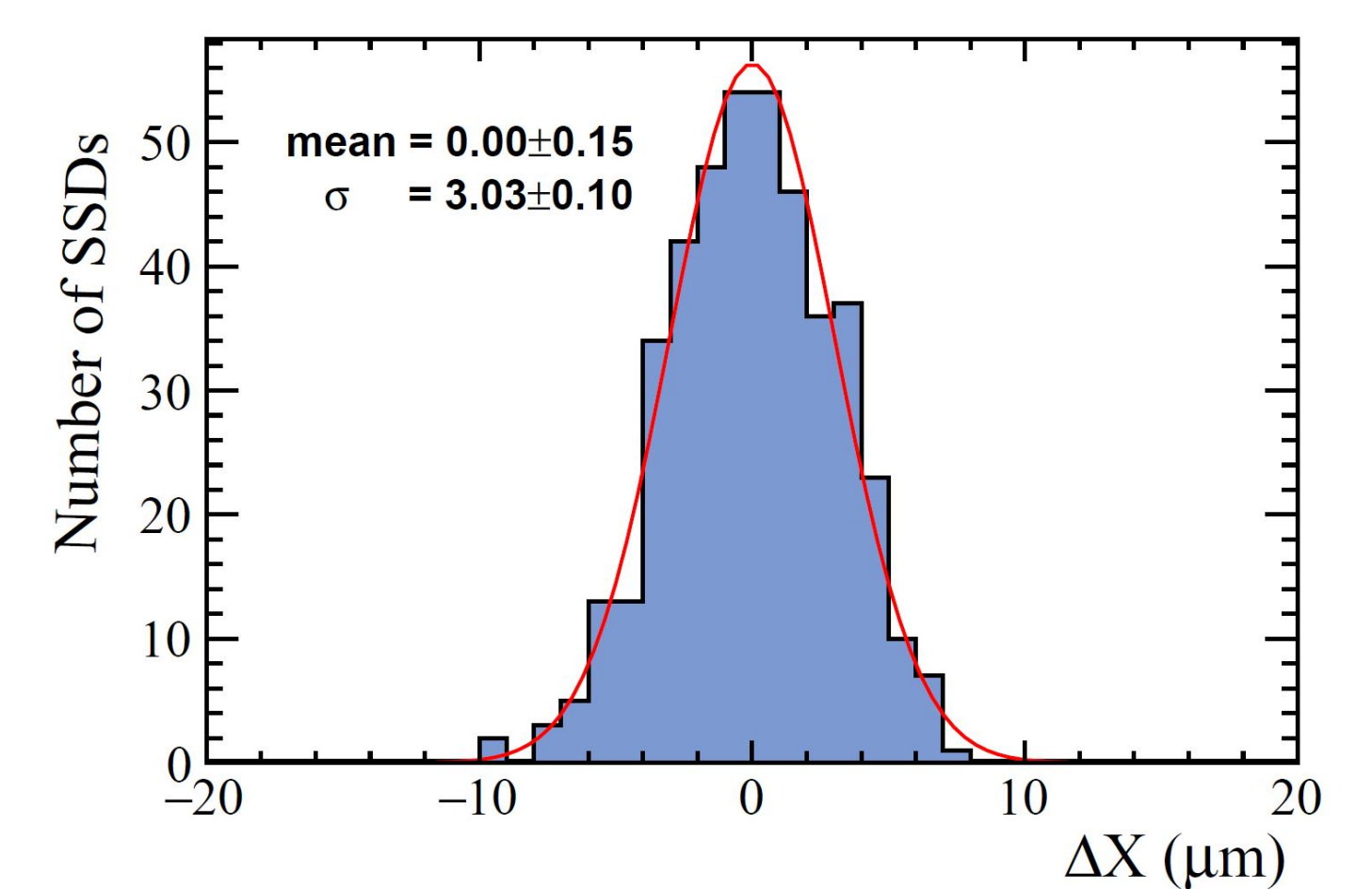
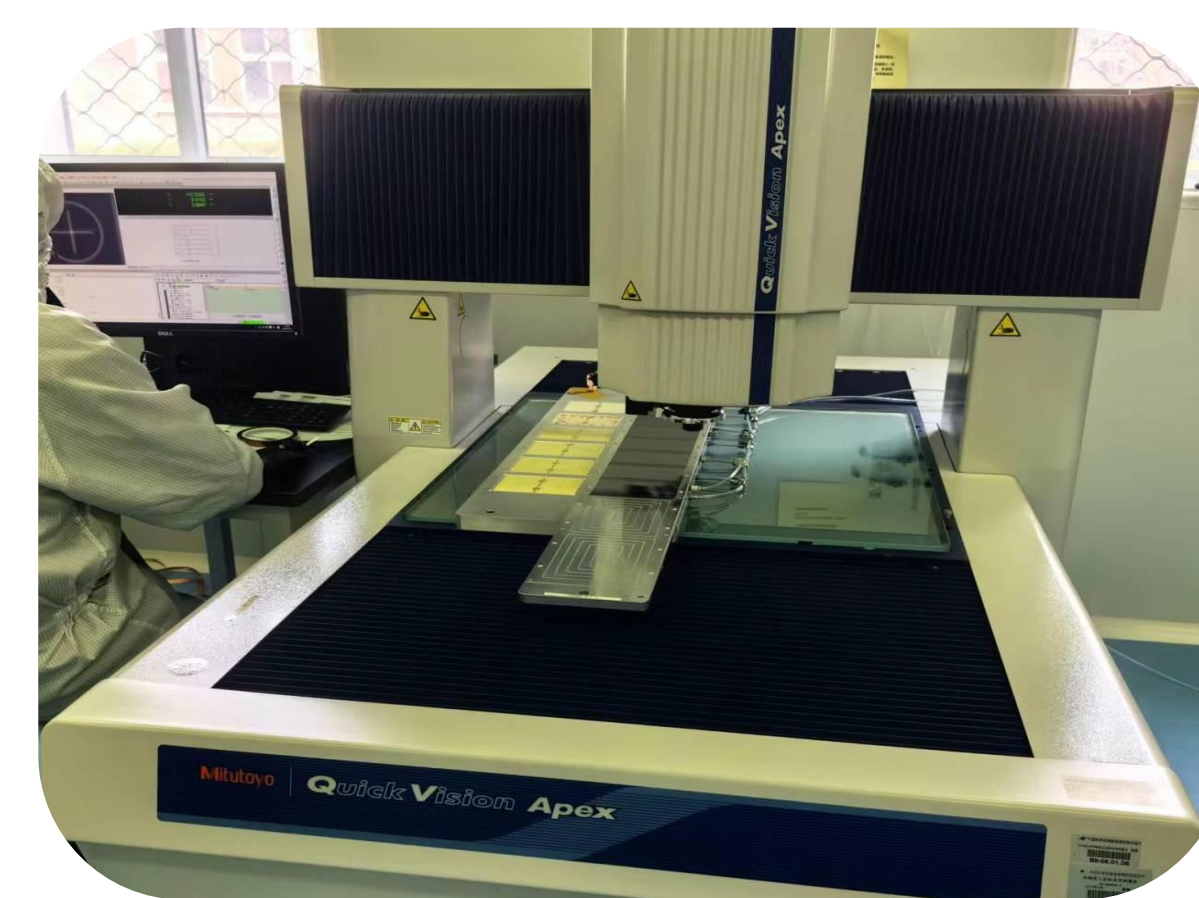
Ladder assembly procedure

Chinese team (IHEP and SDIAT) use a custom designed robotic gantry to achieve high precision assembly, the sigma of positions in x axis is better than $5\mu\text{m}$, which is the highlight of the work. The gantry can move in four dimensions: x, y, z, θ with $1\mu\text{m}$ and 10^{-6} rad precision. There are two high resolution cameras on the gantry head that can recognize two fiducial marks on one SSD at the same time, they provide real-time coordinates information of SSD.



Designated vacuum pick up tool is attached to the gantry head to suck up SSD, and bring SSD to the desirable location on the top of LBB(L0 Bias Board), where the structure and conductive glue is already dispensed by the vacuum devices on the gantry head. After putting down one sensor, adjust the position by controlled movements of gantry head, then cut the vacuum of gantry head and turn on the vacuum under the pick up tool, finally leave the pick up tool pressing down the SSD on LBB, now one SSD is done. When the glue is cured, remove the pick up tools.

Once the ladder is assembled, an optical metrology system is used to measure all the fiducial marks and fit the coordinates to give the sigma in x axis.



By September 10th, we have finished all high quality ladders.

