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AMSL0 Ladder Production

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The AMSL0 upgrade project will add a 2-plane silicon stripe track detector layer to the original 9-layer detector of AMS. The sensitive area of new layer is about 8 square meters in total. This new layer will triple the acceptance of cosmic rays of the AMS and significantly improve its performance in identifying heavy ions. The sensitive area planes are composed of 72 ladders, including 40 ladders with 12 sensors, 16 ladders with 10 sensors, and 16 ladders with 8 sensors. All the ladders need to be produced, and then assembled to the whole plane, so the production of ladders is an important part. In order to ensure good spatial resolution of the detector, the lateral variance of the sensor positions of a ladder should be less than 5 microns.

Ladder production is based on a customized gantry. Gantry head can achieve micron-level movement accuracy in four dimensions: x, y, z and θ . It includes a vacuum to suck up a pick-up tool, which is used for moving a sensor. Two camera with micron-level precision on the gantry head are used to identify the fiducial marks to measure the position of sensor. All of the above procedures are operated through a custom software. This poster will show the ladder production details and results.

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