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8. Mass production and performance of large area thermal bonding Micromegas\DMM detectors

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Micromegas detectors have been widely studied and applied in high-energy physics experiments due to their advanced performances such as high spatial resolution, high counting rate, radiation resistance, and cost-effectiveness, since its invention in the 1990s. In response to the performance requirements of different experiments, high-performance, large-area Micromegas detectors and their mass production have become important technical issues that need to be overcome.

This report will introduce the progress of Micromegas manufacturing technology based on the thermal bonding method. In recent years, we have developed large area Micromegas detectors with sensitive areas of $400 \times 400 \text{ mm}^2$ and $600 \times 600 \text{ mm}^2$, and completed the production of a batch of detectors for cosmic ray track detection by adopting a series of quality control methods such as material selection, condition control, and high-voltage aging etc. The test results show that its position resolution reaches about 130 um and the detection efficiency reaches better than 95%. In addition, several large-area, high-performance double Micromegas (DMM) detectors have been also successfully fabricated. Preliminary test results of higher than 105 gas gain and better than 10% gain uniformity indicate its good application potential in future.

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