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# Ultra-long MicroStrip Gas Counter for Spallation Neutron Source Facilities

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We are developing a new ultra-long multi-grid-type microstrip gas counters (640 mm long) for neutron scattering experiments at spallation neutron source facilities. We employed a multi-grid-type electrode structure for stabilizing the gas amplification process in this MSGC. Also, we implemented a global-local-grading method for fast readout method where we divide a cathode signal into two categories. Positive ions are created around the anode strip and they travel to the neighboring two cathode strips. In this process signal charge are divided into two parts. We utilized this nature to encode the incident position. From one cathode strip a rough position is obtained and the other cathode strip provides a fine position. We also implemented a graded cathode pattern. Each cathode strip is composed of two conductive elements. One element is connected to the ground and the other one is connected to readout electronics. Then, we alter the ratio of two conductive areas according to the incident position. This is implemented by a periodical electrode pattern in practice. We used a stepwise change in the rough position. Zig-zag modulation for the fine position. A test plate was successfully fabricated. X-ray test showed an energy resolution of ˜14% FWHM at 5.9keV. The uniform gas gain was obtained through entire active length. Position resolution of 1-4 mm FWHM is obtained and the principle of this method is successfully demonstrated.

Now we are fabricating another series of plates for a large-are 2-D array. Each plate has 8 strips with an anode pitch of 3 mm. We plan to make a tiled 2-D detector with these plates. In this way, we can fabricate very large micropattern gas detectors at a reasonable cost.

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