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Calculation of gas gain for a MSPC detector

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Unlike Multi-Wire Proportional Counter (MWPC), the principle of Micro-Strip Proportional Counter (MSPC) is that the anode and cathode electrodes are very narrow conductor strips. The field strength necessary to produce gas amplification in MSPC is generated between neighbouring strips and by the voltage difference between the strips and the detector cathode, which can be at considerable distance. The application of some Single Wire Proportional Counter (SWPC) gain formulas to MWPC depends on the radial symmetry of the electric field. In the MSPC, there is no such radial symmetry, and the transformation is not possible. Therefore, application of a gas gain formula to MSPC need to take into account the difference in MSPC geometry from that of SWPC and MWPC. In this study, the Diethorn formula was used to calculate the gas gain in a MSPC filled with Xe+5%CO2 at different gas pressures. The results of the measured and the calculated gas gain were found to be in good agreement.

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