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Carbon Sputtering Technology for MPGD detectors

Carbon sputtering is a promising technology for making resistive electrodes for MPGDs. The research on this technology started in the context of the development of MicroMEGAS detectors for the ATLAS muon system upgrade. By sputtering carbon layers of varying thickness (a few hundred to a few thousand angstrom) the surface resistivity can be controlled between 400 kΩ/sq. and 2 GΩ/sq. Several small (10×10 cm^2) and medium size foils (50×100 cm^2) have been produced and successfully tested. The next step is to produce foils of the final size of 2.2×0.5 m^2 required for the ATLAS MicroMEGAS. The carbon layer is deposited on thin (50 to 100 μm) insulating foils (e.g., polyimide) by sputtering resulting in a good uniformity ($< 30\%$) of the resistivity. Extremely fine electrodes structures (< 50 μm) can be achieved using the liftoff process technique. The foils produced so far are extremely robust with respect to mechanical and chemical damage.
We report on the fabrication technique and the performance in operating detectors. Given the positive experience with MicroMEGAS detectors we also address other possible applications that could be interesting for MPGD detectors, e.g., Micro Pixel Chambers, GEMs, etc.

Author: Dr OCHI, Atsuhiko (Kobe University (JP))

Co-authors: YAMANE, Fumiya (Kobe University (JP)); TERAO, Shingo (University of Tokyo (JP)); KAWAMOTO, Tatsuo (University of Tokyo (JP)); MASUBUCHI, Tatsuya (University of Tokyo (JP)); TAKEMOTO, Tsuyoshi (Kobe University (JP)); HOMMA, Yasuhiro (Kobe University (JP)); KATAOKA, Yousuke (University of Tokyo (JP)); YAMAZAKI, Yuji (Kobe University (JP)); KAWANISHI, Yuki (University of Tokyo (JP))

Presenter: Dr OCHI, Atsuhiko (Kobe University (JP))

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