Aging Tests of Micro–Strip Gas Chambers for the CMS Forward Tracker at Mons University

presented by **Evelyne Daubie**

Service de Physique Générale et Physique des Particules, B-7000 Mons, Belgium

Our group performed a systematic study of MSGC aging effects aiming at the determination of their optimal performances in the framework of the design of the CMS forward tracker. A series of tests was conducted on prototypes under various operating conditions (glass substrates, Ar/DME or Ne/DME gas mixtures, gas set-up purity-8230). Irradiation was performed using an X-ray generator. The different steps of our investigations will be summarized and commented on.

Summary of Talk: Our group performed a series of tests on MSGC's which were conducted in the framework of the design of the CMS forward tracker. The main research effort was oriented towards testing the rate capability of MSGC's and studying aging effects. It included prototype work and morphological studies of the surface of substrates before and after exposure to X-ray radiation. The investigations were done on MSGC prototypes in the cleanest operating conditions possible: use of a custom-built gas system made of all metal components (tubing, connectors, mixer, and flowmeters), chamber mounted in a stainless steel or PEEK box with a thin-foil aluminum front window and metal-glass feed-through. Irradiation was done using an X-ray generator equipped with a collimator with either a thick absorber in front (for preliminary tests : plateau - gain - energy resolution) or a thin absorber in front for long-term high-rate measurements The tests were performed under various conditions of glass substrates (ionic or electronic conductivity, semi-conductive coatings), employing a geometry of anode and cathode strips alternating with 200 – 956 μm pitch (Au or Cr metal). The anodes were connected together to the voltage supply while the cathodes were ganged in 3 groups of around 50 strips each and set to ground potential, allowing the recording of pulse height with a charge sensitive amplifier or the measurement of the current with a electrometer. The gas mixtures used were Ar/DME 50:50 or Ne/DME 50:50. The experimental set-up will be described with emphasis on the different steps aiming at improvements of MSGC aging behavior. The morphological study of substrates performed by means of specific instruments (polarizing microscope, profilemeter) will be presented. The results obtained in our systematic study of aging effects will be summarized and commented on.