



Contribution ID: 22

Type: **Oral Contribution**

First high rate test of a MRPC detector with novel low resistivity float-glass electrodes

Tuesday, 11 February 2020 15:00 (20 minutes)

Multigap Resistive Plate Chambers (MRPC) with an excellent time accuracy in the range of sub-nanoseconds are often used as time-of-flight detector. For the Compressed Baryonic Matter experiment (CBM) at GSI/FAIR, MRPCs are required to work in the CBM-TOF-wall at particle fluxes on the order of 1-10 kHz/cm² for the outer region and 10-25 kHz/cm² for the central region. The high bulk resistivity of normal soda-lime float glass reduce the usage of RPC with such electrodes to fluxes below 1 kHz/cm², that's why different types of low resistive glasses and ceramics are under consideration for MRPC-electrodes, to improve the rate capability of the TOF detectors. A new type of commercially available thin low-resistivity float-glass could sufficiently reduce the costs of the central region of the TOF-wall. We report on the working and timing characteristics of a MRPC built with this new low-resistivity electrode material. The tests have been performed, using the continuous single-electron beam at ELBE/Dresden. This 10-gap MRPC with 160 μm gaps reaches 97% efficiency for mipis at 19.2 kV and a time resolution of 36 ps at particle fluxes near 2 kHz/cm². At a flux of 100 kHz/cm², the efficiency is still above 95% and a time resolution of 50 ps is obtained, which would fulfil the requirement of CBM.

Primary authors: Dr LIU, Z. (European Centre for Nuclear Research (CERN), Geneva, Switzerland ICSC World Laboratory, Geneva, Switzerland); Dr BEYER, R. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Dr DREYER, J. (HZDR); Mr FAN, X. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Mr GREIFENHAGEN, R. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Dr KIM, D.W. (Gangneung-Wonju National University, Gangneung, South Korea); Dr KOTTE, R. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Dr LASO GARCIA, A. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Dr NAUMANN, L. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Mrs ROEMER, K. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Mr STACH, D. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany); Prof. URIBE ESTRADAD, C. (Benemerita Universidad Autonoma de Puebla, Mexico); Prof. WILLIAMS, M.C.S. (European Centre for Nuclear Research (CERN), Geneva, Switzerland, Gangneung-Wonju National University, Gangneung, South Korea, INFN and Dipartimento di Fisica e Astronomia, Universita di Bologna, Italy); Prof. ZICHICHI, A. (European Centre for Nuclear Research (CERN), Geneva, Switzerland, INFN and Dipartimento di Fisica e Astronomia, Universita di Bologna, Italy, Museo Storico della Fisica e Centro Studi e Ricerche E. Fermi, Roma, Italy)

Presenter: Dr NAUMANN, L. (Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany)

Session Classification: New Ideas