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The use of Low-Temperature Cofired Ceramics technology in Gas Electron Multiplier detectors

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The Low-Temperature Cofired Ceramic (LTCC) technology is known as a highly suitable material for the production of electronic microstructures in 3D. In particular, the material is characterized by good mechanical and electrical properties, a wide range of operating temperatures, high thermal conductivity and low outgassing. Additionally, the high radiation resistance of such materials has been already confirmed. Such a combination of parameters makes LTCC an excellent candidate for High Energy Physics (HEP) applications. The preliminary tests have been already conducted at Wroclaw University of Science and Technology concerning manufacturing Gas Electron Multiplier (GEM) amplification elements as well as readout plates. The first LTCC-GEM prototypes have been manufactured, and the results are presented. Research is continued to improve their parameters as well as produce microstructures with diameters that are difficult to obtain by standard “wet etching” techniques. It is anticipated that the developed technology will be used for specialized applications and the production of prototype systems or small series.

Collaboration

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