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# Micro Pattern Gas Detector Technologies and Applications - the work of the RD51 Collaboration (12' + 3')

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Micro Pattern Gas Detector Technologies and Applications:
an overview of the CERN-RD51 Collaboration activities

Driven by the availability of modern photolithographic techniques, Micro Pattern Gas Detectors (MPGD) have been introduced at the end of the 20th century by pioneer developments: Microstrip Gas Chambers (MSGC), Gas Electron Multipliers (GEM) and Micromegas, later followed by thick-GEM (THGEM), resistive GEM (RETGEM) and other novel micro-pattern devices. Nowadays intensive R&D activities in the field of MPGDs and their diversified applications are pursued by the large CERN- RD51 collaboration. The aims are to facilitate the development of advanced gas-avalanche detector concepts and technologies and associated electronic-readout systems, for applications in basic and applied research. MPGD systems now offer robustness, very high rate operation, high precision spatial resolution (sub 100-micron), and protection against discharges. MPGDs became important instruments in current particle-physics experiments and are in development and design stages for future ones. They are significant components of the upgrade plans for ATLAS, CMS, and ALICE at the LHC, exemplifying the beneficial transfer of detector technologies to industry. Beyond their design for experiments at future facilities (e.g. ILC), MPGDs are considered for rare-event searches, e.g. dark matter, double beta decay and neutrino scattering experiments. Detectors sensitive to x-rays, neutrons and light are finding applications in other diverse areas such as material sciences, hadron therapy systems, homeland security etc.
The areas of research activities within the RD51 MPGD collaboration includes detector physics & technology, model simulations, , readout electronics, production techniques, common test facilities, and applications. By this broad coverage RD51 brings together leading experts in the field of detector science and detectors users, resulting in effective progress over a wide array of applications.
This talk will review the activities of the RD51, its major accomplishments so far, and future plans.

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