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New materials for the RPCs of the next future

RPCs presently working in many accelerator and cosmic ray experiments are made up with resistive plates of phenolic laminate (improperly referred to as “bakelite”) or glass. They are operated with gas mixtures mostly constituted of $C_2H_2F_4$, $i-C_4H_{10}$, and small amounts of SF_6 . In the next future however all these materials should be reconsidered for different reasons. Indeed for the resistive plates a mechanically more stable material than phenolic laminate would be of great interest to improve the RPC performance and a lower resistivity glass would also be crucial to improve the glass-RPC rate capability. Concerning the gas, an alternative to the use of $C_2H_2F_4$ will be needed to reduce the environment impact (measured by the GWP) and possibly the cost of the present gas mixtures. Finally new types of front end electronics, which should be considered as an intrinsic part of the detector, will be crucial for any further development. A last relevant point in the search for new materials will be the cooperation with the industry, not only for the procurement of the items needed for the RPC construction but also in the perspective that some new RPC application could be of interest even outside of the Particle Physics community. The proposed talk will focus the present situation concerning the search for new materials for the RPCs to be developed in the next future.

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