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Exploring the internal structure of exotic resonances with ALICE

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The investigation of the quark content of hadrons has been a major goal of non-perturbative strong interaction physics. In the last decade, several resonances in the mass range $1000\text{--}2000\text{ MeV}/c^2$ have emerged that cannot be explained by the quark model. The internal structure of exotic resonances such as f_0 , f_1 , and f_2 is currently unknown. Different scenarios are possible ranging from two-quark, four-quark, molecule, a hybrid state, or glueballs. A modification of the measured yields of these exotic hadrons in A–A and p–A collisions as compared to pp collisions has been proposed as a tool to investigate their internal structure.

The excellent particle identification capabilities of the ALICE detector along with the large data sample collected in pp and p–Pb collisions provide an opportunity for multi-differential studies of such high-mass resonances. In this presentation, the first-ever measurement of f_1 production in pp collisions and measurements of f_0 and f_2 production both in pp and p–Pb collisions will be presented. The measurements of their mass, width, and yields will be presented and their sensitivity to the internal structure of these exotic resonances will be discussed. These results will pave the way for future experimental investigations on the internal structure of other exotic hadrons.

Category

Experiment

Collaboration (if applicable)

ALICE

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