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Event shape and multiplicity dependence of $K^{*\pm}(892)$ and $\phi(1020)$ production in pp collisions at $\sqrt{s} = 5.02$ TeV with ALICE at the LHC

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The study of hadronic resonances such as K^* and ϕ provides a unique tool to investigate the interplay of re-scattering and regeneration effects in the hadronic phase of heavy-ion collisions. As the K^* has a lifetime comparable to the lifetime of the hadronic phase, one would expect to observe the effects of re-scattering and regeneration processes in the measured K^* production yield. In contrast, the ϕ meson has a longer lifetime compared to other resonances. Thus, it is expected that its yields will not be affected by regeneration and re-scattering. So far, most of the measurements of hadronic resonances in pp collisions have been used as baselines for heavy-ion collisions. However, recent indications of the possible formation of QGP droplets and the presence of a hadronic phase in small systems makes the study of hadronic resonance production in small systems more important. Event shape observables like transverse sphericity, along with charged-particle multiplicity, can serve as an important tool to separate isotropic and jetty events, which can help in understanding the recently observed phenomena in small systems in a more differential manner.

We report measurements of $K^{*\pm}$ and ϕ meson production in pp collisions at $\sqrt{s} = 5.02$ TeV as a function of charged particle multiplicity and transverse sphericity, reconstructed in their hadronic decay channels of $K_S^0\pi^\pm$ and K^+K^- , respectively. These results include the transverse momentum, p_T , distributions, integrated yield and mean- p_T of $K^{*\pm}$ and ϕ in different sphericity and multiplicity classes. The results will be compared to pQCD inspired models such as PYTHIA and EPOS-LHC.

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