

# Inclusive production of $f_2(1270)$ tensor mesons at the LHC via gluon-gluon fusion in the $k_t$ -factorization approach

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The gluon-gluon fusion for  $\eta_c$  and  $\chi_c$  quarkonium production is known to be the dominant mechanism [1,2]. In contrast the mechanism of light  $f_2(1270)$  tensor meson production is not known. We calculate inclusive cross section for  $f_2(1270)$  tensor meson production for gluon-gluon fusion in the  $k_t$ -factorization approach using different unintegrated gluon distributions from the literature [3]. The process is also interesting in the context of searches for saturation effects encoded in unintegrated gluon distributions. The energy-momentum tensor, equivalent to  $L = 2$ ,  $J_z = 2$  and  $L = 2$ ,  $J_z = 0$  couplings are used for the  $g^*g^* \rightarrow f_2(1270)$  vertices. The parameters are extracted from  $\gamma\gamma \rightarrow f_2(1270) \rightarrow \pi\pi$  reactions by comparison to Belle data on  $\gamma\gamma \rightarrow \pi^+\pi^-$  and  $\gamma\gamma \rightarrow \pi^0\pi^0$  reactions. The results strongly depend on the parametrization of the  $g^*g^* \rightarrow f_2(1270)$  form factor. Our results for  $pp \rightarrow f_2(1270)$  are compared to preliminary ALICE data. The agreement with the data can be achieved only at larger  $f_2(1270)$  transverse momentum, only for some parametrizations of the  $g^*g^* \rightarrow f_2(1270)$  form factor. No obvious sign of the onset of saturation is observed. At low transverse momenta one needs to include also final state pion-pion rescattering. The agreement with the ALICE data can be obtained by adjusting probability of formation and survival of  $f_2(1270)$  in a harsh quark-gluon and multipion environment.

[1] I. Babiarez, R. Pasechnik, W. Schaefer and A. Szczurek, JHEP2002, 037 (2020).

[2] I. Babiarez, R. Pasechnik, W. Schaefer and A. Szczurek, paper ready for submission.

[3] P. Lebidowicz and A. Szczurek, a paper in preparation.

## Secondary track (number)

**Primary authors:** SZCZUREK, Antoni (Institute of Nuclear Physics); LEBIEDOWICZ, Piotr (Institute of Nuclear Physics PAN)

**Presenter:** SZCZUREK, Antoni (Institute of Nuclear Physics)

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