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## Exclusive diffractive production of pion pairs and resonances in proton-proton collisions within tensor pomeron approach.

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We present estimates of the cross sections and differential distributions for central exclusive two and four pions production being studied at RHIC and LHC. The amplitudes for the processes are formulated in terms of the double tensor pomeron and  $f_{2Reg}$  reggeon exchanges with the vertices respecting the standard crossing and charge-conjugation relations of Quantum Field Theory.

In the reaction  $pp \rightarrow pp\pi^+\pi^-$  we include the dipion continuum, the dominant scalar and tensor resonances decaying into  $\pi^+\pi^-$  pairs as well as the contribution from photoproduction ( $\rho(770)$  and Drell-S\"oding terms). The theoretical results are compared with the existing STAR, CDF, CMS experimental data and predictions for planned or current experiments

(ATLAS, ALICE) are presented. We find that the relative contribution of resonant  $f_2(1270)$  and dipion continuum strongly depends on the cut on four-momentum transfer squared  $t_{1,2}$  which may explain some controversial observations made by different ISR experiments in the past. We suggest some experimental analyses to fix model parameters related to the pomeron-pomeron-meson coupling. We present first predictions of the  $\sigma\sigma$  and  $\rho\rho$  contributions to the  $pp \rightarrow pp\pi^+\pi^-\pi^+\pi^-$  reaction. We compare the four-pion results of our calculation with the ISR experimental data. We show the influence of the experimental cuts on the integrated cross section and on various differential distributions for outgoing particles. The cuts may play then the role of a  $\pi\pi$  resonance filter.

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