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## On the pair correlations of neutral K, D, B and $B_s$ mesons with close momenta produced in inclusive multiparticle processes

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The phenomenological structure of inclusive cross-sections of the production of two neutral K mesons in hadron–hadron, hadron–nucleus and nucleus–nucleus collisions is theoretically studied taking into account the strangeness conservation in strong and electromagnetic interactions. Relations for the dependence of correlations of two short-lived and two long-lived neutral kaons

 $K_S^0 K_S^0$ ,  $K_L^0 K_L^0$  and correlations of "mixed" pairs  $K_S^0 K_L^0$  at small relative momenta upon the space-time parameters of the generation region of  $K^0$  and  $\bar{K}^0$  mesons

are obtained – involving the contributions of Bose-statistics and S-wave strong final-state interaction of two  $K^0$  ( $\bar{K}^0$ ) mesons as well as of

the  $K^0$  and  $\bar{K}^0$  mesons, and also the additional one of transitions  $K^+K^- \to K^0\bar{K}^0$ , and depending upon the relative fractions of generated pairs  $K^0K^0$ ,  $\bar{K}^0\bar{K}^0$  and  $K^0\bar{K}^0$ . It is shown that under the strangeness conservation the correlation functions of the pairs  $K^0_S K^0_S$  and  $K^0_L K^0_L$ , produced in the same inclusive process, coincide, and the difference between the correlation functions of the pairs  $K^0_S K^0_S$  and  $K^0_L K^0_L$  is conditioned exclusively by the production of the pairs of non-identical neutral kaons  $K^0\bar{K}^0$ .

For comparison, analogous correlations for the pairs of neutral heavy mesons  $D^0$ ,  $B^0$  and  $B_s^0$ , generated in multiple inclusive

processes with charm (beauty) conservation, are also theoretically analyzed – neglecting, just as for  $K^0$  mesons, the small effects of CP violation. These correlations have the quite similar character and they are described by quite similar expressions: in particular, just as for  $K^0$  mesons, the correlation

functions for the pairs of states with the same CP parity  $(R_{SS} = R_{LL})$  and with different CP parity  $(R_{SL})$ do not coincide, and the difference between them is conditioned exclusively by the production of pairs  $D^0 \overline{D}^0$ ,  $B^0 \overline{B}^0$  and  $B_s^0 \overline{B}_s^0$ .

However, contrary to the case of  $K^0$  mesons, here the distinction of CP-even and CP-odd states (and, hence, the experimental observation of respective pair correlations) encounters difficulties – due to the insignificant differences of their lifetimes and the relatively small probability of purely CP-even and CP-odd decay channels. Nevertheless, one may expect that this

will become accessible at future colliders.

Author: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna )

Co-author: Dr LYUBOSHITZ, Vladimir (Joint Institute for Nuclear Research, Dubna)

Presenter: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research, Dubna )

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