

Hadronic interactions at the CERN SPS: resonance decays versus parton dynamics

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Using new data on pion production in p+p interactions from the NA49 experiment, it is demonstrated that the detailed features of double differential pion cross sections are well reproduced over most of the phase space from the decay of a representative sample of known mesonic and baryonic resonances.

13 resonances reaching up to spin four tensor-mesons and including the newly measured N^* resonances up to the $N^*(1680)$ have been used. The p_T integrated Feynman x_F distributions in the high- x_F region $0.4 < x_F < 0.9$ are quantitatively reproduced as well as the p_T distributions up to 2 GeV/c and beyond at all x_F .

In both these phase space regions direct effects of parton dynamics such as valence quark fragmentation or hard parton scattering are generally evoked in order to provide a basis of understanding. The saturation of the measured yields by heavy resonance decay casts serious doubts on these assumptions which are contained in most available microscopic production models. As resonance decay is known to be non-thermal, also thermodynamic models should be critically re-inspected.

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