

# ON ASYMPTOTIC REGGE TRAJECTORIES OF HEAVY MESON RESONANCES

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## S u m m a r y

We performed the analysis of the asymptotic behavior of Regge trajectories of nonstrange and strange mesons and found that the width of heavy hadrons for these trajectories cannot linearly depend on their mass. Such a finding clearly demonstrates that a widely spread belief on the linear mass dependence of the resonance width contradicts the linearity of Regge trajectories on the Mandelstam variable  $s$ . Using the data on masses and widths for  $\rho_{J--}$ ,  $\omega_{J--}$ ,  $a_{J++}$ , and  $f_{J++}$  mesons with the spin values  $J \leq 6$  and for  $K_J^*$  mesons with  $J \leq 5$ , we extracted the parameters of the asymptotically linear Regge trajectories predicted by the finite-width model of quark gluon bags. It is shown that the parameters obtained for the data sets B and D are consistent with the cross-over temperature determined by the lattice QCD simulations at the vanishing baryonic density and with the kinetic freeze-out temperature of early hadronizing particles found in relativistic heavy ion collisions at and above the highest SPS energy. Comparing the resonance width of sets B and D evaluated at the masses of  $Z$  and  $W$  bosons, respectively, we discovered that the calculated width values match that of the gauge bosons. We argue that such matches provide us with indirect, but the first experimental evidence for the compositeness of  $Z$  and  $W$  bosons. Based on these findings, we assume that  $Z$ ,  $W$ , and Higgs bosons have the Regge trajectories which are similar to the asymptotic trajectories of the studied mesons. The predictions for the masses and widths of the Regge partners of  $Z$  and  $W$  bosons and for the mass dependence of the widths of Higgs boson Regge partners along with the values for the mass and width of the scalar Higgs mesons are made as well.