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Glueball and meson spectroscopy within the holographic graviton soft-wall model

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In this contribution we present the main results of the calculations of spectra of meson and glueballs. To this aim the so called graviton soft-wall (GSW) has been used. This holographic semi-classic approximation to non perturbative QCD has been developed for the first time in Ref. [1] to calculate the scalar and tensor component spectra of glueballs. In particular we proposed to consider as dual field of the glueball operator in QCD a graviton propagating in a modified space with respect to the usual AdS5, i.e. the space involved in the known AdS/QCD approaches. The resulting spectra were described by linear trajectories has expected from lattice QCD. In particular, the quoted ground state mass is comparable with that addressed same years later in Ref. [2]. Moreover, with this model, also the light scalar meson spectrum has been calculated, see Refs. [3, 4], together with the mixing condition, between scalar and glueball states. The main result is that above masses of 2 GeV pure glueball state are expected. In addition in Ref. [5] the GSW model has been applied to heavy scalar, vector, a1 and pseudo-scalar meson spectra. The results obtained with only two and not flexible parameters are comparable with present data. Finally, in Ref. [6] a strategy based on the longitudinal light-front dynamics, see e.g. Ref. [7, 8], has been adopted to implement chiral symmetry breaking into the GSW model to describe the pion. This approach has been used to calculate (with only two additional parameters coming from the longitudinal contribution) the pion: spectrum, form factor, effective form factor [9], distribution amplitude, transitional form factor and parton distribution function. Also in this case results are in fair agreement with data and thus highlighting the predicting power of the GSW model.

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