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Three-gluon vertex in Landau gauge from lattice QCD: planar degeneracy and beyond.

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We present an extensive study of the three-gluon vertex in Landau-gauge using quenched lattice-QCD calculations. The main goal of this work is exploring the features of the vertex beyond the well-known symmetric and soft-gluon kinematical configurations, and extend the results for those two kinematics to the general case of three different momenta q , r and p are only restricted by the condition $q+r+p=0$ imposed by momentum conservation. We will show how a rational use of Bose symmetry in the choice of the tensors used to develop the transversely projected vertex allows to unveil a quite simple description of the vertex form-factors in the non-perturbative regime of QCD in terms of a single momentum scale formed by the sum of the squares of the three incoming four-momenta $s^2 = (q^2 + r^2 + p^2)/2$. We will evidence as well a clear dominance of the tree-level form factor for any kinematical configuration, something that allows a quite simple description of the vertex in terms of this contribution. The phenomenological implications of these findings will as well be discussed.

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