

Glueball Decay in the Witten-Sakai-Sugimoto model

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I present new results on glueball decay rates in the Sakai-Sugimoto model, a holographic top-down approach for QCD with chiral quarks based on a probe-brane construction within Witten's holographic model of nonsupersymmetric Yang-Mills theory. We calculated¹ rates for decays into two pions, two vector mesons and four pions, using a range of the 't Hooft coupling which closely reproduces the decay rate of ρ and ω mesons and leads to a value for the gluon condensate consistent with QCD sum rules. We concluded that the holographic mode corresponding to the lowest excitation of a dilatonic scalar provides a narrow glueball state in the right mass range for an identification with $f_0(1500)$ or $f_0(1710)$, while the results actually favour the latter as a glueball candidate. This conclusion receives further support from our latest work² on implementing finite masses for pseudoscalar mesons by extrapolating from the calculable vertex of glueball fields and the η' meson, which is a consequence of the Witten-Veneziano mechanism. In line with the mechanism of chiral suppression³, we found a considerable enhancement of the decay of scalar glueballs into kaons and the η meson, in close agreement with experimental data on $f_0(1710)$.

References

1. F. Br unner, D. Parganlija and A. Rebhan, *Glueball Decay Rates in the Witten-Sakai-Sugimoto Model*, arXiv:1501.07906.
2. F. Br unner and A. Rebhan, *Nonchiral enhancement of scalar glueball decay in the Witten-Sakai-Sugimoto model*, arXiv:1504.xxxxx.
3. M. Chanowitz, Phys. Rev. Lett. **95**, 172001 (2005).