MAGIC

Science of the Cosmos

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Is $\eta(1760)$ a Glueball?

The search for new states of matter has been the subject of study and research, as well as their identification in colliders, with exotic states being identified in experiments around the world in recent years. Among the possible exotic states provided in QCD we have the glueball, a bound state between gluons. Using a non-relativistic gluon bound state model, we calculate $\Gamma(G \to \gamma\gamma)$, where G is a pseudoscalar digluon (0^{-+}), which is applied to the meson $\eta(1760)$. We start from the amplitudes, where we consider the process $\gamma\gamma \to g^*g^*$, with the g^*s being the massive constituent gluons and the amplitudes obtained in the lowest-order perturbative QCD deriving them from the QED calculation. The unknown parameters of the model such as the digluon wavefunction are obtained using experimentally measured values of the decay of $\Gamma(J/\Psi \to G\gamma)$. We compare our theoretical results with current experimental limits for $\eta(1760)$, our glueball candidate.

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