

Decay of a Vector Glueball in a Chiral Approach

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Based on:

F. Giacosa, J.S., S. Janowski,
Phys.Rev. D95 (2017), 114004

Research for Glueballs

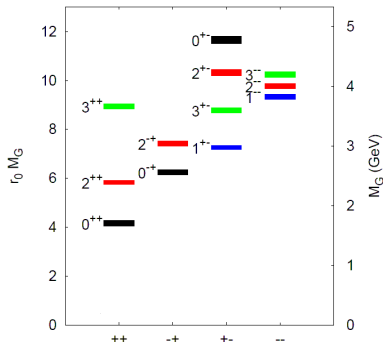
What is a glueball?

- Interacting gluons



- Vector glueball:
 $J^{PC} = 1^{--}$
 with a Mass of 3.8 GeV
- Inspire: find t Glueball:
 1,453 papers

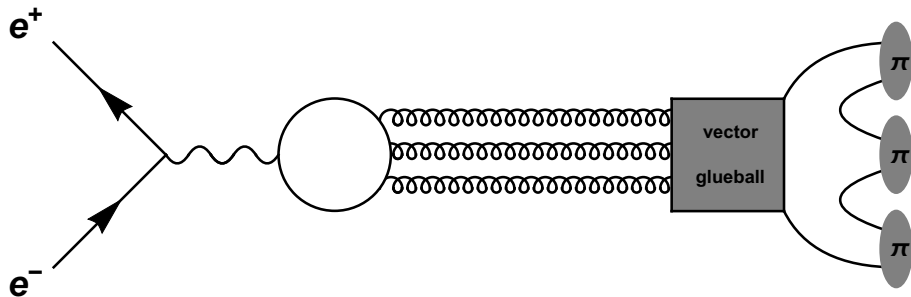
Glueball Masses from LATTICE



Chen et al. PRD 73 01456 (2006)

Experimental Search for Glueballs

BES III: Elektron-positron-scattering



Other Experiments: PANDA, GlueX

extended Linear Sigma Model (eLSM)

- The eLSM is a low-energy model for three-flavour QCD where $\bar{q}q$ -states and gluons appear as fundamental degrees of freedom.
- Observables: Decay widths, masses, cross sections
- Studies in vacuum, at finite temperature and density

$$\mathcal{L}_{1,\text{two-body}} \sim \mathcal{O}_\mu \text{Tr} \left[\Phi^\dagger \tilde{\Phi}^\mu + \tilde{\Phi}^{\mu\dagger} \Phi \right]$$

$$\mathcal{L}_{2,\text{two-body and three-body}} \sim \mathcal{O}_\mu \text{Tr} \left[L^\mu \Phi \Phi^\dagger + R^\mu \Phi^\dagger \Phi \right]$$

$$\mathcal{L}_{3,\text{two-body}} \sim \mathcal{O}^\sigma \text{Tr} \left[L^\mu \Phi R^\nu \Phi^\dagger \right]$$

Details are in Phys.Rev. D95 (2017), 114004
 AND ON MY POSTER

Details of the eLSM are in *Phys. Rev. D87, 014011*

Conclusion: Decay Channels

Our *strongest* decay channels are:

First channel: $\mathcal{O} \rightarrow KK_1$ $\mathcal{O} \rightarrow b_1\pi \rightarrow \omega\pi\pi$

Second channel: $\mathcal{O} \rightarrow \pi KK^*$ $\mathcal{O} \rightarrow \rho KK^*$ $\mathcal{O} \rightarrow a_0\rho$ $\mathcal{O} \rightarrow \omega\pi\pi$

Third channel: $\mathcal{O} \rightarrow \rho\pi$ $\mathcal{O} \rightarrow KK^*$ $\mathcal{O} \rightarrow \rho a_1$

Results in numbers are in Phys.Rev. D95 (2017), 114004
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