

The scalar and tensor glueball in production and decay

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Evidence for the scalar and the tensor glueball is reported. The evidence stems from an analysis of BESIII data on radiative J/ψ data into $\pi^0\pi^0$, $K_S K_S$, $\eta\eta$, and $\phi\omega$. The coupled-channel analysis is constrained by a large number of further data. The scalar intensity is described by ten scalar isoscalar mesons, covering the range from $f_0(500)$ to $f_0(2330)$. Five resonances are interpreted as mainly-singlet states in SU(3), five as mainly-octet states. The mainly-singlet resonances are produced over the full mass range, the production of octet state is limited to the 1500 to 2100 MeV mass range. The peak is interpreted as scalar glueball. Its mass, width and yield are determined to $M_{\text{glueball}} = (1865 \pm 25) \text{ MeV}$, $\Gamma_{\text{glueball}} = (370 \pm 50^{+30}_{-20}) \text{ MeV}$, $Y_{J/\psi \rightarrow \gamma G_0} = (5.8 \pm 1.0) \cdot 10^{-3}$. The study of the decays of the scalar mesons identifies significant glueball fractions. The tensor wave shows the $f_2(1270)$ and $f_2'(1525)$ but no clear structure above their masses. An interpretation of these data is suggested.

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