

# Structure of Mass Gap between Two Spin Multiplets for Heavy-Light Systems

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## Summary

Only explanation for the mass gap between two spin multiplets has been given by an effective Lagrangian approach, i.e., Goldberger-Treiman relation proposed by Bardeen et. al. Bardeen and Hill related their expression with a constituent quark mass and claimed linear dependence on its mass. Studying our semirelativistic potential model, we find a simple relation between the mass gap and a light quark mass. Our relation seems to hold very well for D and Ds heavy mesons. This may give some insight into the DsJ problem intrinsic to heavy mesons. We need to find Bs(0+) and Bs(1+) mesons to confirm our prediction. We also try to give some intuitive explanation for our relation.

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