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Prediction of positive parity Bs mesons and search for the X(5568)

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We use a combination of quark-antiquark and $B^{(*)}K$ interpolating fields to predict the mass of two QCD bound states below the B^*K threshold in the quantum channels $J^P = 0^+$ and 1^+ . The mesons correspond to the b-quark cousins of the D_{s0}^* (2317) and D_{s1} (2460) and have not yet been observed in experiment, even though they are expected to be found by LHCb.

In addition to these predictions, we obtain excellent agreement of the remaining p-wave energy levels with the known B_{s1} (5830) and B_{s2}^* (5840) mesons. The results from our first principles calculation are compared to previous model-based estimates. More recently the D0 collaboration claimed the existence of an exotic resonance $X(5568)$ with exotic flavor content $\bar{b}s\bar{d}u$. If such a state with $J^P = 0^+$ exists, only the decay into $B_s\pi$ is open which makes a lattice search for this state much cleaner and simpler than for other exotic candidates involving heavy quarks. We conclude, however, that we do not find such a candidate in agreement with a recent LHCb result.

Author: Dr MOHLER, Daniel (Helmholtz-Institut Mainz)

Co-authors: Prof. LANG, C. B. (Karl-Franzens-Universitaet Graz); PRELOVSEK, Sasa (University of Ljubljana)

Presenter: Dr MOHLER, Daniel (Helmholtz-Institut Mainz)

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