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Even parity open charm mesons

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Since 2003 many new hadrons, including the lowest-lying positive-parity charm-strange mesons D∗s0(2317) and Ds1(2460), have been observed that do not conform with quark-model expectations. We discuss how various puzzles in the charm-meson spectrum find a natural resolution if the SU(3) multiplets for the lightest scalar and axial-vector states, among them the D∗s0(2317) and the Ds1(2460), owe their existence to the nonperturbative dynamics of Goldstone-boson (P) scattering off D(s) and D∗(s) mesons. Most importantly the ordering of the lightest strange and nonstrange scalars becomes natural. We demonstrate for the first time that this mechanism is strongly supported by the recent high quality data on the B–> Dbar PP provided by the LHCb experiment. This implies that the lowest quark-model positive-parity charm mesons, together with their bottom counterparts, if realized in nature, do not form the ground-state multiplet. This is similar to the pattern that has been established for the scalar mesons made from light up, down, and strange quarks, where the lowest multiplet is considered to be made of states not described by the quark model. In a broader view, the hadron spectrum must be viewed as more than a collection of quark-model states.

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