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In-medium mass shift of two-flavored heavy mesons, $B_c, B_c^*, B_s, B_s^*, D_s$ and D_s^*

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The presentation will be based on the recently published article [1] below.

For the first time, we estimate the in-medium mass shift of the two-flavored heavy mesons $B_c, B_c^*, B_s, B_s^*, D_s$ and D_s^* in symmetric nuclear matter. The estimates are made by evaluating the lowest order one-loop self-energies.

The enhanced excitations of intermediate state heavy-light mesons in symmetric nuclear matter are the origin of their negative mass shift. This negative mass shift may be regarded as a signature of partial restoration of chiral symmetry in an empirical sense, because the origin of the negative mass shift in the study is not directly related to the chiral symmetry mechanism.

Our results show that the magnitude of the mass shift for the B_c meson ($\bar{b}c$ or $b\bar{c}$) is larger than those of the $\eta_c(\bar{c}c)$ and $\eta_b(\bar{b}b)$, different from a naive expectation that it would be in between of them. While, that of the B_c^* shows the in-between of the J/ψ and Υ .

We observe that the lighter vector meson excitation in each meson self-energy gives a dominant contribution for the corresponding meson mass shift, B_c, B_s , and D_s .

[1] G. N. Zeminiani, S. L. P. G. Beres and K. Tsushima,
“In-medium mass shift of two-flavored heavy mesons, $B_c, B_c^*, B_s, B_s^*, D_s$ and D_s^* ,”
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doi:10.1103/PhysRevD.110.094045,[arXiv:2401.00250 [hep-ph]].

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