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Effects on the Hadron Propagators due to $k_\mu k_\nu$ Terms in the Vector Meson Propagator

ZHANG Hai-Xia and WU Shi-Shu

Center for Theoretical Physics, College of Physics, Jilin University, Changchun 130023, China
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Abstract: In an approximation where the baryon current conservation is violated, the contribution of the $k_\mu k_\nu$ terms in the vector meson propagator may not vanish. Their effects on the baryon and meson spectral functions and on the consequences of self-consistency are studied in the relativistic self-consistent Hartree-Fock approximation by means of the σ-ω model. Two cases where the $k_\mu k_\nu$ terms are and are not neglected are compared. It is found that there is a marked change in the baryon spectral function which becomes more peaked in the latter case. Such a change remains even by a proper readjustment of parameters. The effects of self-consistency in the σ-ω model are qualitatively the same in both cases, though quantitatively there is some significant difference.

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