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To learn light scalars from semileptonic decays of heavy quarkonia

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The mechanisms of light scalar meson production in the $D_s \rightarrow \bar{s} s e^+ \nu_e$ to $[\sigma(600)+f_0(980)] e^+ \nu_e \rightarrow \pi^+ \pi^- e^+ \nu_e$ decays are compared with the mechanisms of light pseudoscalar meson production in the $D_s \rightarrow \bar{s} s e^+ \nu_e$ to $(\eta/\eta') e^+ \nu_e$ decays. It is shown that the $\bar{s} \rightarrow \sigma(600)$ transition is negligibly small in comparison with the $\bar{s} \rightarrow f_0(980)$ one. As for the $\bar{s} \rightarrow f_0(980)$ transition, its intensity makes near thirty percent from the intensity of the $\bar{s} \rightarrow \eta_s$ ($\eta_s = \bar{s} s$) transition. The $D_s \rightarrow \pi^+ \pi^- e^+ \nu_e$ decays support the previous conclusion about a dominant role of the four-quark components $u\bar{u}d$ and $s\bar{d}$ in the $\sigma(600)$ and $f_0(980)$ mesons, respectively. The program of the light scalar investigation in the semileptonic decays of the $D^+(D^-)$, $D_0(\bar{D}_0)$ and $B^+(B^-)$, $B_0(\bar{B}_0)$ mesons is discussed.

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