

High Energy Physics - Phenomenology

 $B_s \rightarrow f_0(980)$ form factors and B_s decays into $f_0(980)$

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(Submitted on 15 Feb 2010)

We compute the $B_s \rightarrow f_0(980)$ transition form factors using light-cone QCD sum rules at leading order in the strong coupling constant, and also including an estimate of next-to-leading order corrections. We use the results to predict the branching fractions of the rare decay modes $B_s \rightarrow f_0 \ell^+ \ell^-$ and $B_s \rightarrow f_0 \nu \bar{\nu}$, which turn out to be $\mathcal{O}(10^{-7})$ ($B_s \rightarrow f_0(980) \ell^+ \ell^-$, with $\ell = e, \mu$), $\mathcal{O}(10^{-8})$ ($B_s \rightarrow f_0(980) \tau^+ \tau^-$) and $\mathcal{O}(10^{-6})$ ($B_s \rightarrow f_0(980) \nu \bar{\nu}$). We also predict the branching ratio of $B_s \rightarrow J/\psi f_0(980)$ decay under the factorization assumption, and discuss the role of this channel for the determination of the B_s mixing phase compared to the golden mode $B_s \rightarrow J/\psi \phi$. As a last application, we consider $D_s \rightarrow f_0$ form factors, providing a determination of the branching ratio of $D_s \rightarrow f_0 e^+ \nu_e$.

Comments: 11 pages, 5 figures

Subjects: **High Energy Physics - Phenomenology (hep-ph)**; High Energy Physics - Experiment (hep-ex)

Report number: BARI-TH/625-10

Cite as: [arXiv:1002.2880v1](https://arxiv.org/abs/1002.2880v1) [hep-ph]**Submission history**From: Pietro Colangelo [[view email](#)]

[v1] Mon, 15 Feb 2010 14:05:34 GMT (458kb)

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