

## Use of $B \rightarrow J/\psi f_0$ decays to discern the $q$ anti- $q$ or tetraquark nature of scalar mesons

*Friday, 16 August 2013 11:50 (20 minutes)*

We consider the relative decay rates of  $B_0$  and  $B_s$  mesons into a  $J/\psi$  plus a light scalar meson either the  $f_0(500)$  ( $\sigma$ ) or the  $f_0(980)$ . We show that it is possible to distinguish between the quark content of the scalars being quark-antiquark or tetraquark by measuring specific ratios of decay rates. Using current data we determine the ratio of form-factors in  $B_s \rightarrow J/\psi f_0(980)$  with respect to  $B_z \rightarrow J/\psi f_0(500)$  decays to be  $0.99^{+0.13}_{-0.04}$  at a four-momentum transfer squared equal to the mass of the  $J/\psi$  meson squared. In the case where these light mesons are considered to be quark-antiquark states, we give a determination of the mixing angle between strange and light quark states of less than 29 degrees at 90% confidence level. We also discuss the use of a similar ratio to investigate the structure of other isospin singlet states.

### APS member ID

ST693216

**Primary author:** Prof. STONE, Sheldon (Syracuse, LHCb)

**Co-author:** Dr ZHANG, Liming (Syracuse University)

**Presenter:** Prof. STONE, Sheldon (Syracuse, LHCb)

**Session Classification:** Quark and Lepton Flavor Physics

**Track Classification:** Quark and Lepton Flavor Physics