

Non-spectator Di quark Effects on Lifetimes of  $\Lambda_b$ ,  $\Omega_b^{(*)}$  and Weak Decay Rates of  $\Sigma_b^{(*)}$ ,  $\Xi_b^{(*)}$

DAI Wu-Sheng,<sup>1,2</sup> GUO Xin-Heng,<sup>3,4</sup> LI Xue-Qian<sup>1,2</sup> and ZHAO Gang<sup>1,2</sup>

<sup>1</sup> CCAST (World Laboratory), P.O. Box 8730, Beijing 100080, China

<sup>2</sup> Department of Physics, Nankai University, Tianjin 300071, China

<sup>3</sup> Department of Physics and Mathematical Physics and Special Research Center for the Subatomic Structure of Matter, University of Adelaide, SA 5005, Australia

<sup>4</sup> Institute of High Energy Physics, Academia Sinica, Beijing 100039, China

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Abstract: The difference of  $\tau_B$  and  $\tau_{\Lambda_b}$  indicates the role of the light flavors. We calculate the lifetimes of B-meson and  $\Lambda_b$  based on the weak effective Hamiltonian while assuming the heavy baryon is constructed by a heavy b-quark and a diquark containing two light quarks. In this scenario, we use the information of the measured ratio  $\tau_{\Lambda_b}/\tau_B$  as input to predict rates of the inclusive weak decays of  $\Sigma_b^{(*)}$  and  $\Xi_b^{(*)}$  into non-bottom final states. We find that these rates of  $\Sigma_b^{(*)}$  and  $\Xi_b^{(*)}$  are much larger than those of B-mesons and  $\Lambda_b$ . We also give the predictions for the lifetimes of  $\Omega_b$  and  $\Omega_b^*$ . Phenomenological implication of our result is discussed.

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