Radiative Decays: $B_C^{*\pm} \rightarrow B_C^{\pm}\gamma$ in the Relativistic Independent Quark Model

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Abstract. We study the electromagnetic form factor of $B_c^{*\pm}$ meson decays via one photon radiative decays: $B_c^{*\pm} \rightarrow B_c^{*\pm}\gamma$ in the relativistic independent quark (RIQ) model based on a flavor independent average interaction potential in the scalar-vector harmonic form. The momentum dependent space like form factor is analytically continued from space like region $(q^2 \langle 0)$ to the physical time like region: $0 \leq q^2 \leq \left(M_{B_c^{*\pm}} - M_{B_c^{\pm}}\right)$ Our predictions of the coupling constant $g_{B_c^{*\pm} \rightarrow B_c^{*\pm}\gamma} = F_{B_c^* B_c}(q^2 = 0)$ and the decay width $\Gamma(B_c^{*\pm} \rightarrow B_c\gamma)$ are comparable to other model predictions. The decay width $\Gamma(B_C^{*\pm} \rightarrow B_C\gamma)$ which is proportional to $(\Delta m)^3 = (M_{B_c^{*\pm}} - M_{B_c^{\pm}})^3$, is found sensitive to $B_c^{*\pm}$ meson mass. This may help determine the unmeasured $B_c^{*\pm}$ meson mass expected at LHC in near future.

Keywords: Electromagnetic form factor, Coupling constant, Decay width

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