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Mass Spectra of Cascade Bottom–Charm Baryons (Ξ_{bc}, Ξ'_{bc}) in a Relativistic Flux Tube Model

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Using the relativistic flux tube model with spin effects, we present an investigation of the mass spectra of the Ξ_{bc} and Ξ'_{bc} baryons. This quark–diquark approach treats each baryon as a (bc) diquark bound to a light quark by a rotating string-like flux tube, incorporating spin dependent interactions. Our predicted masses for the ground-state Ξ_{bc} and Ξ'_{bc} align closely with earlier theoretical estimates, lending confidence to the model's reliability. Additionally, we provide comprehensive predictions for radially and orbitally excited states across the spectrum. These theoretical results offer crucial guidance for ongoing and future experimental searches (e.g., at the LHC), aiding in the identification of Ξ_{bc} and Ξ'_{bc} baryons signals within complex collision data. As no bottom–charm baryon has been observed yet, our findings establish a timely baseline for guiding potential discoveries in this sector.

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