Multi-types of Skyrmions in SU(N) Quantum Hall System

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Abstract: The skyrmions in SU(N) quantum Hall (QH) system are discussed. By analyzing the gauge field structure and the topological properties of this QH system it is pointed out that in the SU(N) QH system there can exist (N-1) types of skyrmion structures, instead of only one type of skyrmions. In this paper, by means of the Abelian projections according to the (N-1) Cartan subalgebra local bases, we obtain the (N-1) U(1) electromagnetic field tensors in the SU(N) gauge field of the QH system, and then derive (N-1) types of skyrmion structures from these U(1) sub-field tensors. Furthermore, in light of the Φ-mapping topological current method, the topological charges and the motion of these skyrmions are also discussed.

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