Entanglement entropy in quasi-symmetric multi-qubit states.

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Summary: We generalize the symmetric multi-qubit states to their $q$-analogs, whose basis vectors are identified with the $q$-Dicke states. We study the entanglement entropy in these states and find that entanglement is extruded towards certain regions of the system due to the inhomogeneity aroused by $q$-deformation. We also calculate entanglement entropy in ground states of a related $q$-deformed Lipkin-Meshkov-Glick (LMG) model and show that the singularities of entanglement can correctly signify the quantum phase transition points for different strengths of $q$-deformation.

Keywords: quantum entanglement; quantum spin chain; quantum group
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