

# Entanglement and symmetry in permutation symmetric states

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We investigate the relationship between multipartite entanglement and symmetry, focusing on permutation symmetric states. We use the Majorana representation, where these states correspond to points on a sphere. Symmetry of the representation under rotation is equivalent to symmetry of the states under products of local unitaries. The geometric measure of entanglement is thus phrased entirely as a geometric optimisation, and a condition for the equivalence of entanglement measures written in terms of point symmetries. Finally we see that different symmetries of the states correspond to different types of entanglement with respect to SLOCC interconvertibility.

Comments: 4 pages, 2 figures. Preliminary versions of some of these results were presented in the QIT 16 workshop in Japan, D. Markham, Proceedings of QIT 16, Japan (2007)

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