QUANTUM AND TOPOLOGICAL ENTANGLEMENT

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Entanglement is a form of correlation among spatially-distinct quantum systems which cannot be described by any classical (local reality) theory. This "spooky action" in the quantum mechanics is now considered to be the key resource for quantum information processing such as quantum computation and quantum cryptography. Recently some people suggested analogy between quantum entanglement and braids. I will explain two examples:

1. analogy between the three qubit GHZ state and the Borromean ring [1]

2. a unitary solution of the Yang-Baxter equation which works as an entangling operator [2]

[1] P. K. Aravind, "Quantum Potentiality, Entanglement and Passion-at-a-Distance: Essays for Abner Shimony", eds. R. S. Cohen, M. Horne and J. Stachel, Kluwer, Dordrecht, 1997, pp53-59.

[2] L. H. Kauffman and S. J. Lomonaco, New J. Physics 4 (2002) pp73.1-73.18

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