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Projection Onto Maximally Entangled States and Products of Random Matrices

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Abstract:

Projection onto maximally entangled states and products of random matrices Abstract We analyze various ensembles of random quantum states and review methods to obtain them numerically as well as to realize them in a realistic physical set up. Due to the measure concentration phenomenon a typical random pure state of a bi-partite system is almost maximally entangled. Taking various measures on the set of pure states one can induce by partial trace various probability measures in the set of mixed states on a reduced system. Other measures can be obtained by taking an even number of subsystems and performing a measurement in the maximally entangled basis. Recent results on random states generated according to the Bures measure and states corresponding to Marchenko-Pastur or Fuss-Catalan distributions of level density are reviewed.