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POS-43 Experimental Classification of Unknown Tripartite Entanglement on Spin Ensemble using NMR

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Experimental generation and detection of the entanglement is at the heart of, most if not all, the quantum computational tasks. In general, to determine whether a given state is entangled or not is an open and exigent problem in quantum mechanics. Here we give an experimental implementation of the scheme for tripartite entanglement detection on spin ensemble using NMR. This protocol not only detects the entanglement but also classify it into six in-equivalent classes of three qubit entangled states. Only four observables suffice to experimentally differentiate the six classes. Experimental realization is achieved in an NMR scenario by mapping the desired observables, to Pauli's z-operators of the third qubit, followed by measuring the ensemble average in the state under investigation. Results have been substantiated with direct full quantum state tomography as well as negativity calculations and the comparison suggests that indeed the demonstration is a success.

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