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Getting Information on Independently Prepared Quantum States – When are Individual Measurements as Powerful as Joint Measurements?[1] CHI-HANG FRED FUNG, H. F. CHAU, University of Hong Kong — Given a composite quantum system in which the states of the subsystems are independently (but not necessarily identically) prepared, we construct separate measurements on the subsystems from any given joint measurement such that the former always give at least as large information as the latter. This construction offers new insights into the understanding of measurements on this type of composite systems. Moreover, this construction essentially proves the intuition that separate measurements on the subsystems are sufficient to extract the maximal information about the separately prepared subsystems, thus making a joint measurement unnecessary. Furthermore, our result implies that individual attacks are as powerful as collective attacks in obtaining information on the raw key in quantum key distribution.

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