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Rate-Distortion Theory for Mixed States Ensembles

Consider the compression of asymptotically many i.i.d. copies of ensembles of mixed quantum states where the encoder has access to a general side information system. The figure of merit is per-copy error. Rate-distortion theory studies the trade-off between the compression rate and the per-copy error. The rate-distortion function is the best compression rate given a certain distortion. In this talk, we derive the rate-distortion functions of mixed-state compression in the entanglement-assisted and unassisted scenarios, and also for the general setting where the consumption of both communication and entanglement are considered. We will discuss consequences of our results and open problems. Joint work with Zahra Baghali Khanian and Kohdai Kuroiwa.