

# QUANTUM MEASUREMENTS AND ENTROPIC BOUNDS ON INFORMATION TRANSMISSION

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While a positive operator valued measure gives the probabilities in a quantum measurement, an instrument gives both the probabilities and the a posteriori states. By interpreting the instrument as a quantum channel and by using the monotonicity theorem for relative entropies many bounds on the classical information extracted in a quantum measurement are obtained in a unified manner. In particular, it is shown that such bounds can all be stated as inequalities between mutual entropies. This approach based on channels gives rise to a unified picture of known and new bounds on the classical information (Holevo's, Shumacher-Westmoreland-Wootters', Hall's, Scutaru's bounds, a new upper bound and a new lower one). Some examples clarify the mutual relationships among the various bounds.