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【571】Accuracy enhancing protocols for quantum clocks

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The accuracy of time information generated by clocks can be enhanced by allowing them to communicate with each other. Here we consider a basic scenario where a quantum clock receives a low-accuracy time signal as input and ask whether it can generate an output of higher accuracy. We propose protocols that, using a clock with a d-dimensional state space, achieve an accuracy enhancement by a factor d (for large d). If no feedback on the input signal is allowed, this enhancement is temporary. Conversely, with feedback, the enhancement can be retained for longer. The protocols may be used to synchronise clocks in a network and define a time-scale that is more accurate than that achieved by non-interacting clocks.

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