# [Talk 2] Fluctuation theorem of entropy production for a partial system in the weak coupling limit

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Small systems in contact with a heat bath evolve by stochastic dynamics. We show that, when one such small system is weakly coupled to another one, it is possible to infer the presence of such weak coupling by observing the violation of the steady state fluctuation theorem for the partial entropy production of the observed system. We give a general mechanism due to which the violation of the fluctuation theorem can be significant, even for weak coupling. We analytically demonstrate on a realistic model system that this mechanism can be realized by applying an external random force to the system. In other words, we find a new fluctuation theorem for the entropy production of a partial system, in the limit of weak coupling.