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**Recognizing the role of microscopic reversibility in stochastic systems with optical trapping experiments as an example** ROSS BRODY, University of Maine — With optical tweezer experiments it is possible to confine a particle and observe its Brownian motion in a region of known potential. Recognizing that microscopic reversibility can lead to interesting relationships involving the particle's motion, for example, the ratio of the conditional probability of making a transition between two points with its spatial reverse is equal to the difference between two Boltzmann factors ($e^{-\Delta U/k_B T}$), or that the time to make an up-well transition is identical to the time to make a down-well transition. With these relationships in mind, and the Onsager-Machlup action description of a path, we consider a particle in an optical tweezer of varying strength and investigate relationships involving the conditional probabilities, the actions associated with specific paths, and the external work done by varying the strength of the trap.

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