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| Title: | Trapped in Out-of-Equilibrium Stationary State: Hot Brownian Motion in Optically Trapped Upconverting Nanoparticles |
| Authors: | Chakraborty, D. (/jspui/browse?type=author&value=Chakraborty%2C+D.) |
| Keywords: | active matter hot Brownian motion nanophotonics optical tweezers upconverting nanoparticles |
| Issue Date: | 2020 |
| Publisher: | Frontiers Media S.A. |
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| Abstract: | Upconverting nanoparticles typically absorb low frequency radiation and emit at higher frequencies relying upon multiphoton processes. One such type of particle is NaYF ₄ :Yb,Er, which absorbs at 975 nm while emitting in visible radiation. Such particles have routinely been optically trapped. However, we find that trapping at the absorption maximum induces non-equilibrium features to the system. When we ascertain the Mean Square Displacement (MSD) of the axial motion, we find features that resemble Hot Brownian Motion (HBM) in active particles. We characterize the HBM observed here and find that the effective translational velocity of the system is 36 nm/s, small enough to be compensated by the optical tweezers. Thus, we have a system which is optically confined and stationary but in non-equilibrium, which we can also use to study non-equilibrium fluctuations. |
| Description: | Only IISER authors are available in the record. |
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