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DARPA/DSO Quest for Undiscovered Energy Storage and Thrust (QUEST) Program
Non-equilibrium Vacuum Fluctuation Forces

Collaborators: *Professors Shanhui Fan (Stanford), Alejandro Rodriguez (Princeton), and Jim Gimzewski (UCLA)*
Designed non-reciprocal gyrotropic nanoparticles that converted fluctuation differences to a motive force. The nanoparticles were predicted to begin rotating on its own due to nonequilibrium fluctuations, reaching a steady state rotation at THz frequencies. Completed detailed design of optical levitation experiment to demonstrate the conversion non-equilibrium fluctuations to motive forces.



ONR "Disruptive Technology Development"

Developed "moonshot" technologies and development methodology for the Commander of Naval Research Admiral Hahn. Research included the evaluation, analysis, and development of multiple approaches to generating forces from vacuum fluctuations.



Limitless Space Institute "Asymmetric Potential Vacuum Fluctuation Forces"

Collaborator: *Professor Yuval Dagan (Technion)*
Maturation of the theoretical basis for the generation of forces from the interaction between vacuum fluctuations and asymmetric structures and potentials. Fabricated symmetric and asymmetric dielectric and optical cavity structures on cantilevers and developed the white light interferometry experimental force measurement methodology.



CASE #700

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