

NON -TECHNICAL ABSTRACT:

The need to manipulate objects of micrometer and sub-micrometer lengths arises often in biology and life sciences. One such example is the need to position and orient objects under atomic force microscopes for measurement of properties. At such scales it is not possible to use probes or other mechanical devices to move these objects. The method used often is to shake the platform they are placed on, akin to sifting small beads (millimeter length) on a sheet of paper to find one of the right color when doing crafts. However, the particles of interest in biotechnology are 1 thousandth (micrometer length) to 1 millionth (nanometer length) the size of beads. The proposed research seeks to improve the fundamental understanding needed to create controlled traveling waves on a plate that can be used to move and orient particles. This has application in biotechnology where measurement of properties on single cells require isolation and positioning them under a probe, in studying nano-scale self assembly of particles to create new materials and devices.