Electronic Supplementary Material (ESI) for Soft Matter.

Energy landscapes for ellipsoids in non-uniform AC electric fields

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SUPPLEMENTARY MATERIAL

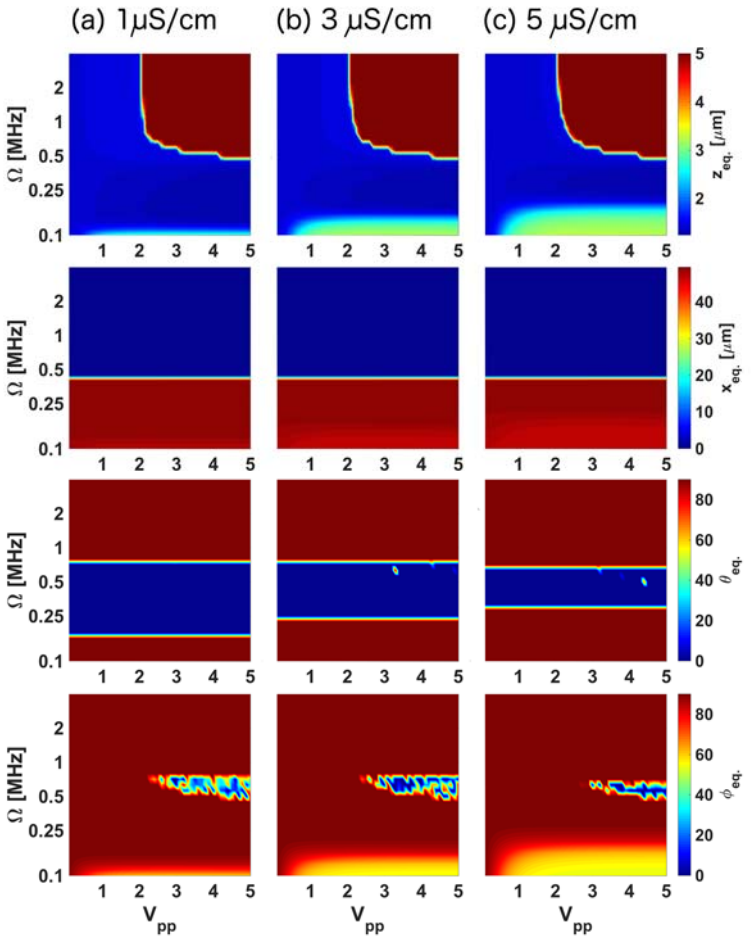

Figure S1. Equilibrium position and orientation of a prolate particle at different medium conductivity values (a) 1, (b) 3, and (c) 5 μS/cm, as a function of the applied field frequency and voltage. The particle elevation has been plotted up to 5 μm for a better representation.

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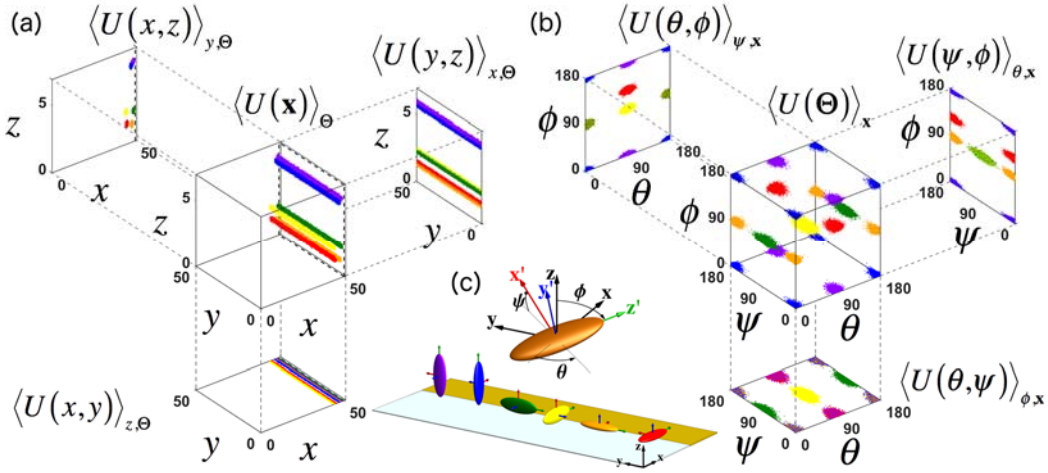

Figure S2. Schematic representation of coordinates for different scalene particle orientations including separated (a) positional and (b) orientational projections. (c) Schematic illustration of 6 possible orientations at the electrode edge where the electric field is a maximum. The same 6 orientations are also possible at the electrode gap center where the electric field is a minimum. Colors in part (c) correspond to the coordinates in the schematics in parts (a) and (b).

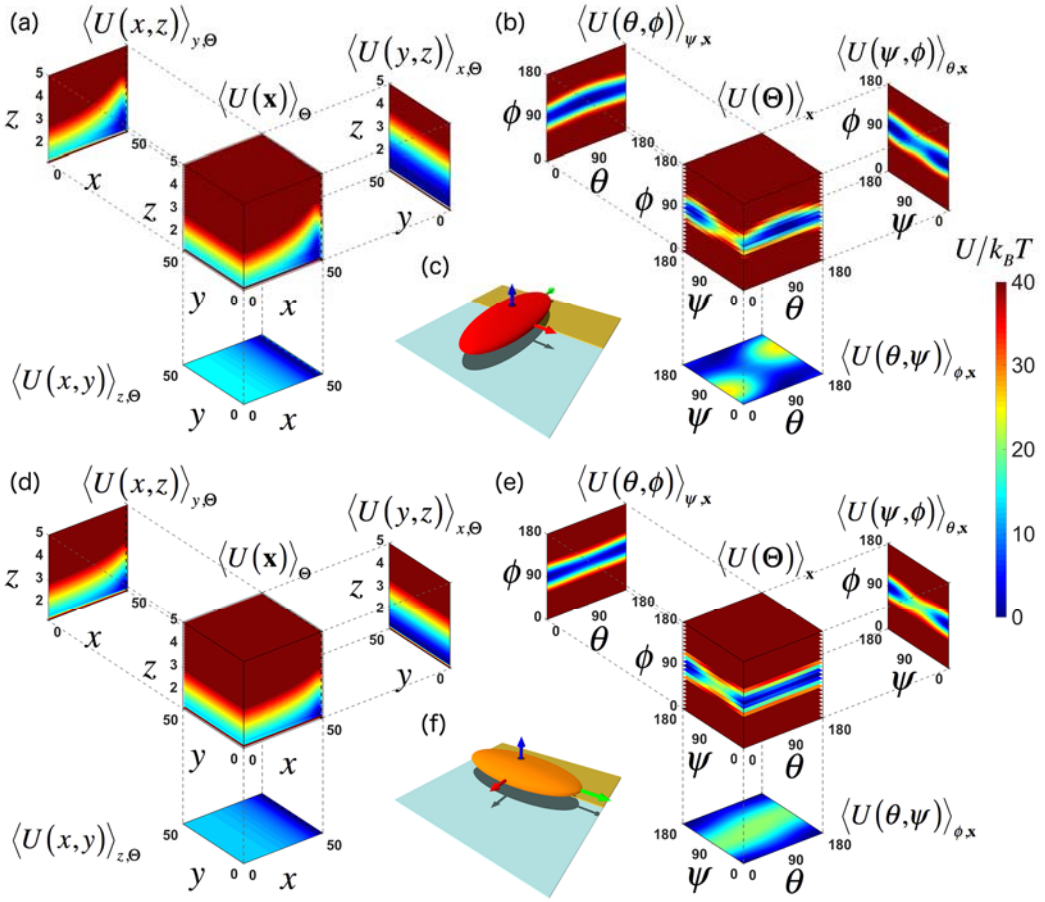

Figure S3. Global energy minimum regions plotted from 0-10 kT for (left) position and (right) orientation projected energy landscapes for scalene ellipsoidal particle (r_x:r_y:r_z = 2:1:5). Field conditions are for 0.3 V_{pp}, and frequencies of (a)-(c) 0.1 MHz and (d)-(f) 0.2 MHz. Average energy projections show the particle can be positioned and oriented at 2 different states (a)-(c) parallel and (d)-(f) perpendicular to the field at electrode gap edge. Positions are reported in μm, angles in degrees, and energy in k_BT on linear spectrum scale bar.

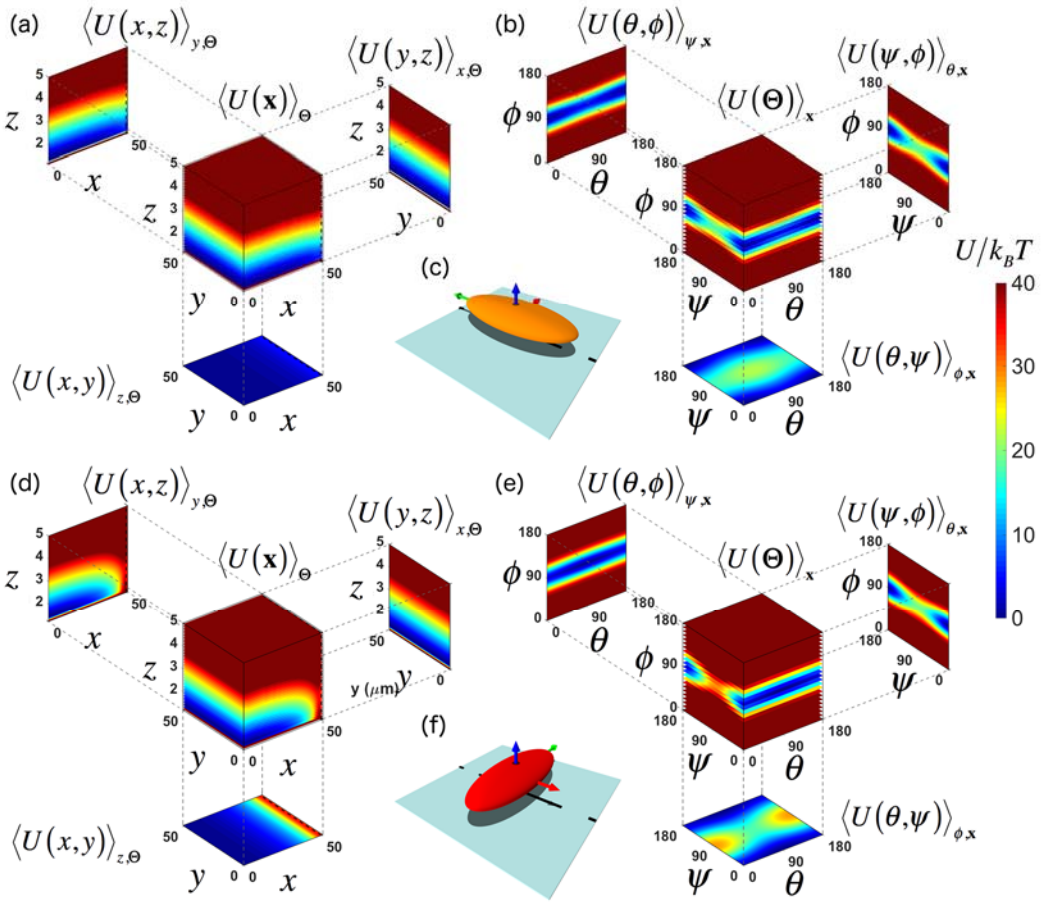

Figure S4. Global energy minimum regions plotted from 0-10 kT for (left) position and (right) orientation projected energy landscapes for scalene ellipsoidal particle (r_X:r_Y:r_Z = 2:1:5). Field conditions are for 0.3 V_{pp}, and frequencies of (a-c) 0.4 MHz, and (d-f) 1.0 MHz. Average energy projections show the particle can be positioned and oriented at 2 different states (a)-(c) parallel and (d)-(f) perpendicular to the field in the electrode gap center. Positions, angles, and energy have same units and scales as Fig. 5.