# Localization of clumps of charged particles in a linear electrodynamic trap with a charged filament

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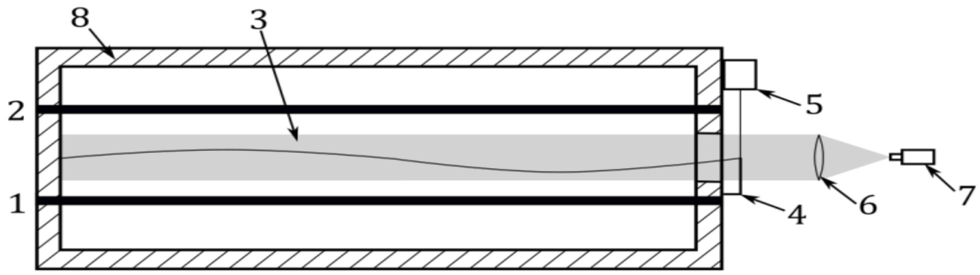


***Figure 1. Experimental setup, side view of a linear trap. 1 and 2 - trap electrodes; 3 - nylon thread; 4 - thread attachment device; 5 - thread tension device; 6 -lens; 7 - laser; 8 - transparent protective box.***

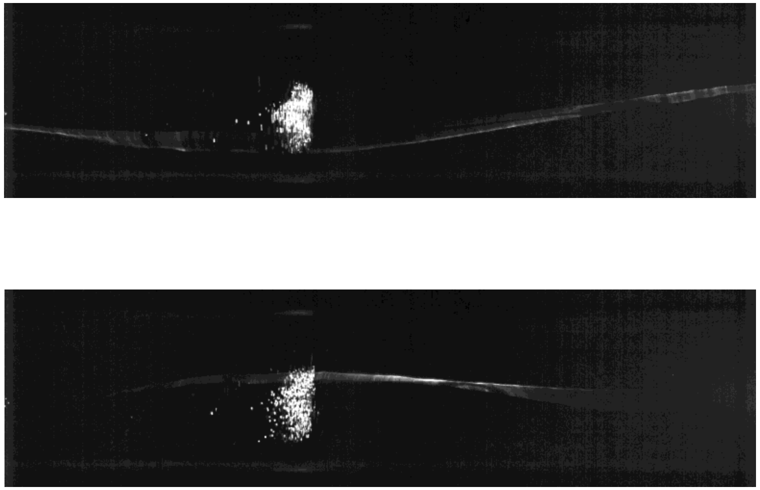

***Figure 2. Images of the antinode of an oscillating filament with a captured cloud of charged dust particles. The time shift between the images is half the period of oscillation of the thread.***

***Figure 3. Images of the trajectory of the thread in the node (the first image), in the antinode without particles and in the antinode with charged particles. View from the end of the trap. In the lower right corner, a bright spot is visible due to the strong scattering of laser radiation on the trap electrode.***

**Experiments and computer simulations have shown that rotational movements similar to standing waves occur in a stretched charged filament. A charged filament in this motion captures charged particles in the volume of the Paul trap and shifts them into the wave antinode. Since the clump of particles has a volumetric charge, as a result of the repulsive forces, the amplitude of the thread trajectory becomes larger. Such particle capture actually means that the rotating charged filament is an additional dynamic trap for a bunch of charged particles. The use of such an additional trap makes it possible to create clumps of charged particles with a higher concentration and a higher volume charge.**