

Cleaning dielectric surfaces by the linear electrodynamic Paul trap

**Syrovatka R A[®], Deputatova L V, Filinov V S,
Pecherkin V Ya, Vasilyak L M and Vladimirov V I**

Joint Institute for High Temperatures of the Russian Academy of Sciences,
Izhorskaya 13 Bldg 2, Moscow 125412, Russia

[®] syrovatkara@gmail.com

A method against dust pollution of dielectric surfaces is proposed. The dust removal is achieved applying alternating electric fields of special geometry created by the linear electrodynamic Paul traps, which polarize dust particles on the surface of the dielectric and draw them into the interelectrode space of the trap. The captured dust can be contactlessly moved toward the electrodes ends in a special container by an additional constant electric field. The feasibility of the approach was demonstrated by a series of experiments on the contactless removal of aluminum oxide and silica sand sifted through sieves with a mesh size of 400, 280, 200 and 100 μm from a glass surface and solar panels. It was shown that the cleaning method proposed effectively copes with the removal of sand particles smaller than 200 μm in size from a horizontal surface. Through numerical simulation, the capture of a single particle has been analyzed. For a particle of a specific size, the range of product $Q \times U$ necessary for its capture and levitation have been found.