# Optimization of micro-electrodes for DNA fragments labelled to microbeads manipulation and characterization

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**Abstract**

Deoxyribonucleic acid (DNA) is the inborn material in humans and almost all other organisms. The movement of neutral polarizable particles from the site of the lowest strength of the electric field to the site of the most strength is known as Dielectrophoresis (DEP). DEP Distinguished from their counterparts of other techniques in manipulation and identification of biological cells and DNA. Many applications of natural and artificial DNA forms depend on the studies dedicated to the characterization of DNA. It is able to differentiate between different types of cells by observing the response of it towards a non-uniform electric field. In this study, a DEP based platform is proposed for manipulation and identification of the DNA fragments that are labeled on specific microbead. However, this platform includes a set of electrodes that allows simultaneous manipulation, trapping and controlling. Different designs of DEP-based microelectrode in micro size are simulated using COMSOL Multiphysics 5.4. This comparison is studied in order to get the optimized design for trapping and identification of DNA fragments that are labeled on specific microbeads.

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