**Device for Cell Analysis**

*Isomotive Dielectrophoresis for Enhanced Analysis of Particle Sub-Populations*

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**Highlights**

- An electrokinetic analytical tool that allows for extraction of dielectric properties of individual particles;
- Application of a uniform dielectrophoretic (DEP) force to all particles within the viewing area allows individual particles (e.g., cells) to be observed simultaneously;
- Potentially lower device fabrication and operation costs as compared with previous techniques for cell subpopulation and analysis.

**Inventors**

- Stuart J. Williams, Ph.D.

**Current Status**

- **IP Status**: Filed
- **Development Status**: Prototype devices have been fabricated and preliminarily tested.
- **Fields of Use Available**: All

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**Technology**

In recent years, new scientific techniques have spawned an overwhelming number of identified genes, encoded proteins, engineered cell types, and assays for studying these genes, proteins, and cells. As the number of possible combinations of samples, reagents, and assays increases, it has become apparent that novel approaches are necessary to understand and utilize this complexity.

To address that need, University of Louisville researchers have developed an isomotive dielectrophoresis (IsoDEP) device and methods that allow for extraction of dielectric properties of individual particles (e.g., cells) using particle tracking or particle velocimetry measurements.

The device is particularly well suited for analysis of cell subpopulations (individual analysis of cells). Previous dielectric techniques have been used to differentiate subpopulations of cells including bacteria, phytoplankton, breast cancer sublines, CTCs from non-transformed cells, leukocyte subpopulations, and blood types. Notably, cells manipulated by DEP do not appear to be damaged from exposure to the applied fields. Given that electrokinetic techniques are generally more portable than fluorescent techniques (e.g., flow cytometry) the IsoDEP device has potential applications in first responder environments.

The devices work by applying an electric field, which translates polarizable particles with negligible net charge. A key distinction of this device, compared to other DEP devices, is that IsoDEP generates an electric field such that the induced DEP force is constant for all particles within the optical viewing area. By separately tracking each particle for a variety of applied AC field frequencies, the dielectric properties of individual particles can be obtained.

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*This technology is available for licensing, further development or industrial partnering.*

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