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VIRTUAL ELECTRODES FOR HIGH-DENSITY ELECTRODE ARRAYS

HARDWARE, CIRCUITS, & SENSORS

Neurostimulator that uses virtual electrodes to manipulate average current density and enhance signal resolution without causing undesired tissue damage.

TECHNOLOGY TYPE

Biotechnology
Biosensors

STAGE OF DEVELOPMENT

Ongoing research to optimize the effect and determine the most effective patterns.

IP PROTECTION

U.S. Utility Patent Issued

Virtual Electrodes for High-Density Electrode Arrays
US9155879B2

Divisional Patent Issued

Virtual Electrodes for High-Density Electrode Arrays
US9656061B2

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Reference Number:
U-5079

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TECHNOLOGY SUMMARY

Neurostimulators are used to stimulate human tissue in many applications, including retinal prostheses and neurological disease treatments. Neurostimulators often use more than one electrode to improve the stimulation resolution and efficacy of the array. Regular electrodes, however, present zones of large current density such that increasing the number of electrodes in one array causes tissue damage.

Virtual electrodes enhance stimulation resolution without causing tissue damage by creating large current density zones away from the electrodes. A virtual electrode is placed between two regular electrodes to enhance the signal quality and increase targeting capabilities. By routing the current from each regular electrode, the array can stimulate tissue not directly under the electrodes. This increases stimulation resolution without overstimulating one specific area.

FEATURES AND BENEFITS

- Enhances stimulation resolution on miniature electrode arrays.
- Increases targeting capabilities of electrode signals.
- Avoids size limitations common with standard neurostimulators.
- Provides improved charge distribution and current injection.

RECENT PUBLICATIONS

Loizos, K., Cela, C., Marc, R., Lazzi, G. (2016). Virtual electrode design for increasing spatial resolution in retinal prosthesis. *Healthcare Technology Letters*. 3(2): 93-97. doi: [10.1049/htl.2015.0043](https://doi.org/10.1049/htl.2015.0043)

INVENTOR PROFILE

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