

StarSwitch Enhancing Electrode Placement for Neurostimulation

Background



1 in 5 adults live with chronic pain in the US¹

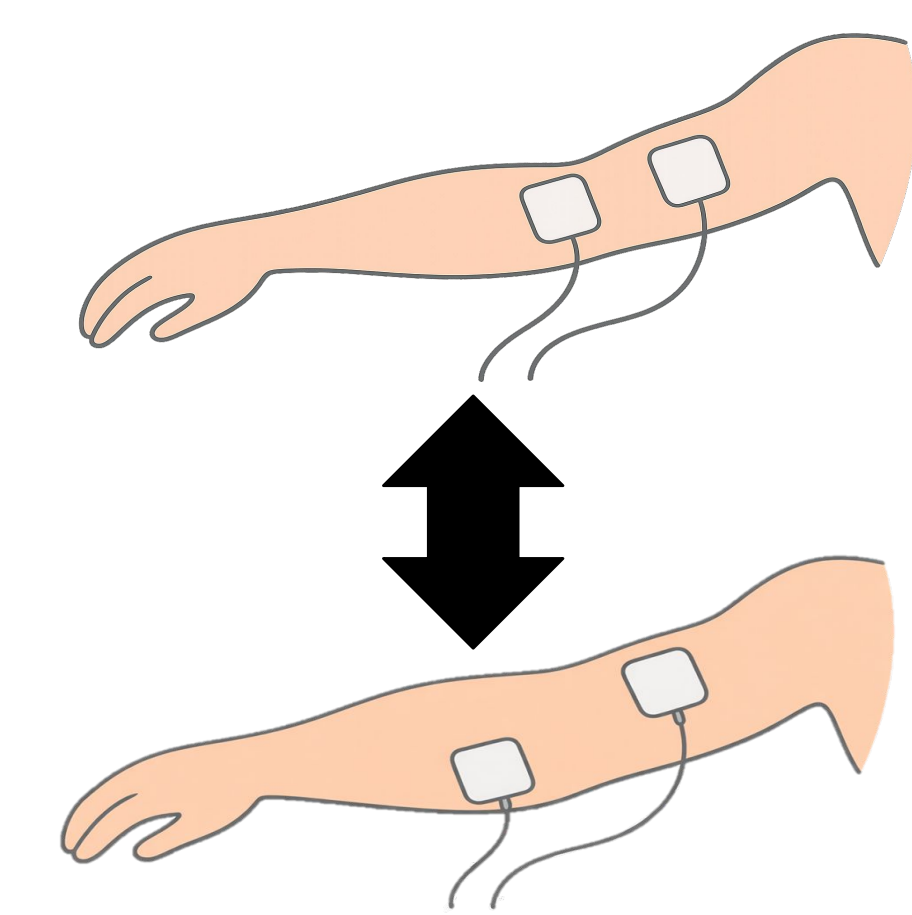
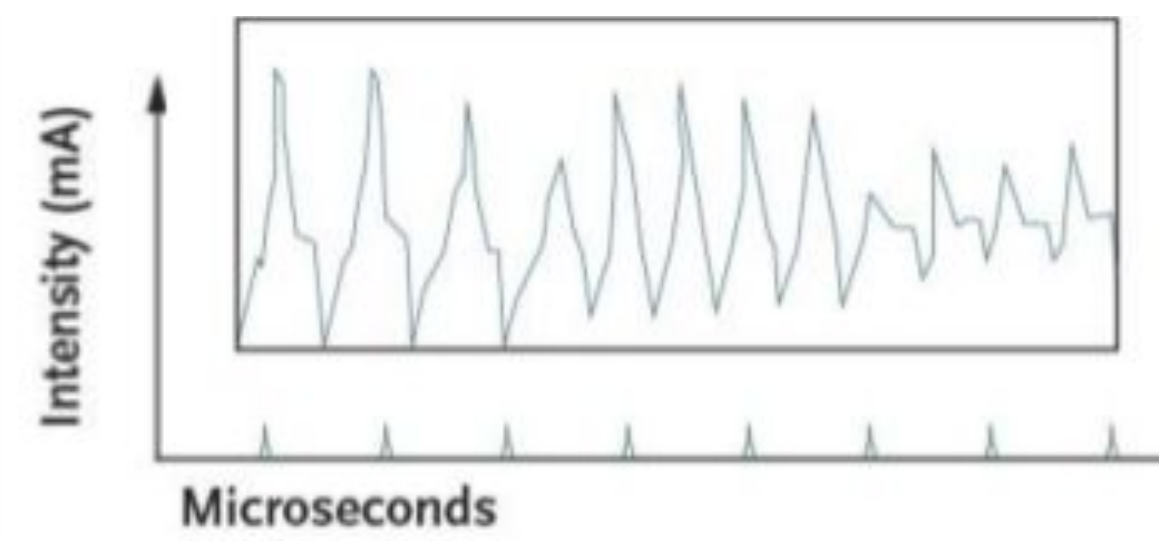
Current **frontline treatments** are **insufficient** for **50%** of patients³

\$8000

In additional annual medical costs for each individual with chronic pain²

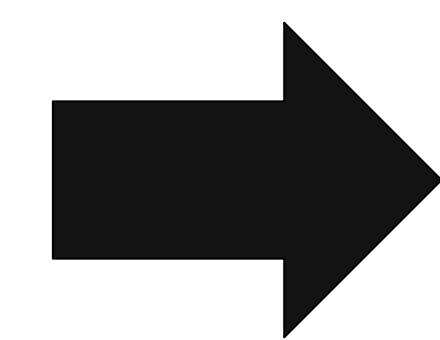
Scrambler Therapy

New electrical stimulation therapy that provides **meaningful pain relief for 80-90%** of patients
Uses variable, nonlinear waveforms to **reduce overactivation** of nerve fibers responsible for chronic pain



Placement of electrodes is **manual, iterative**, and requires **real time patient feedback**.

Heavily dependent on **clinician experience** and **trial and error**



Scrambler Therapy requires **10 - 12 consecutive visits** with **25+ hours of treatment**

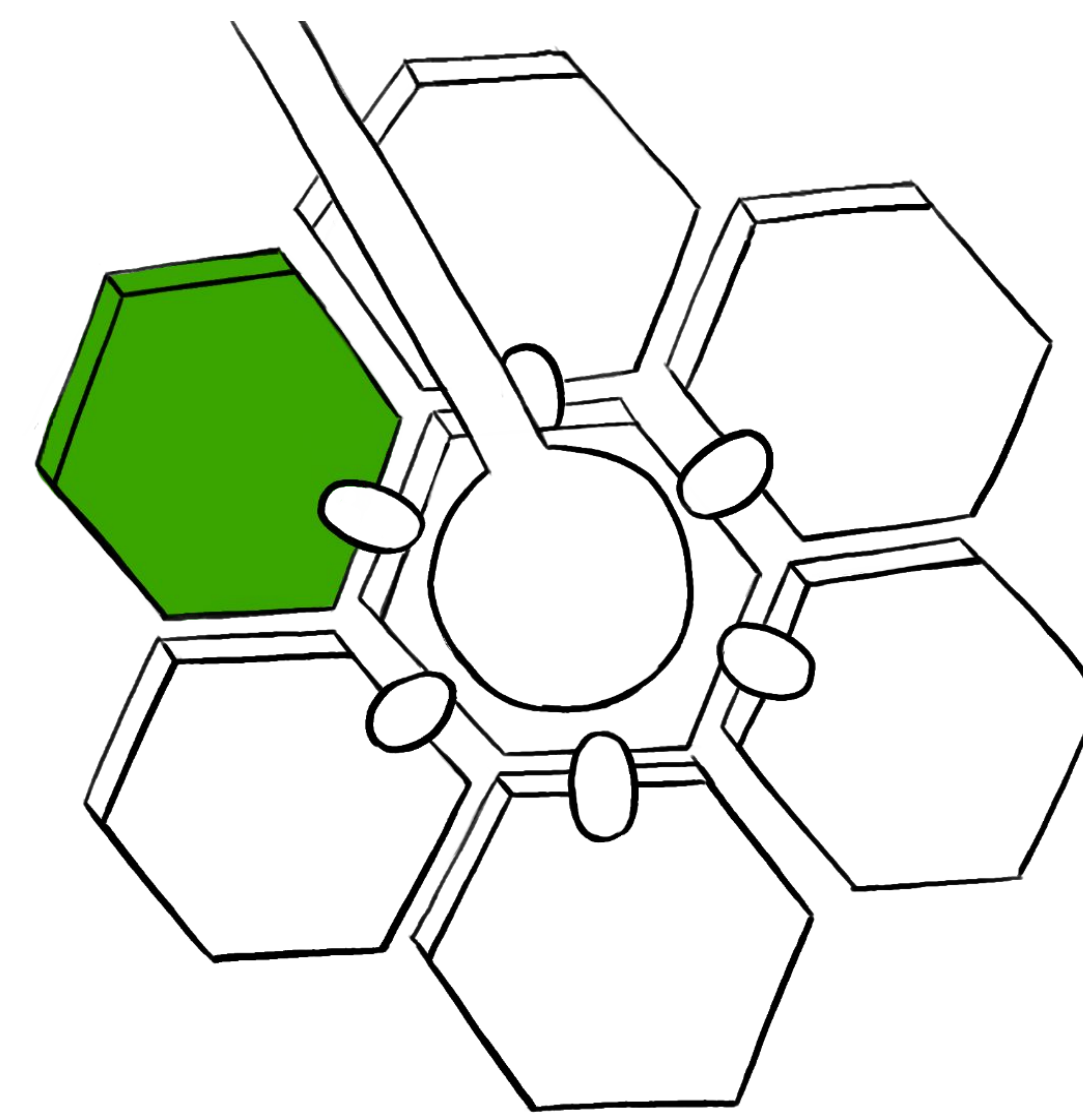
33% of each session is spent **placing electrodes**, delaying actual treatment time

Patients **do not experience pain relief** and are wasting time on an **inefficient solution**.

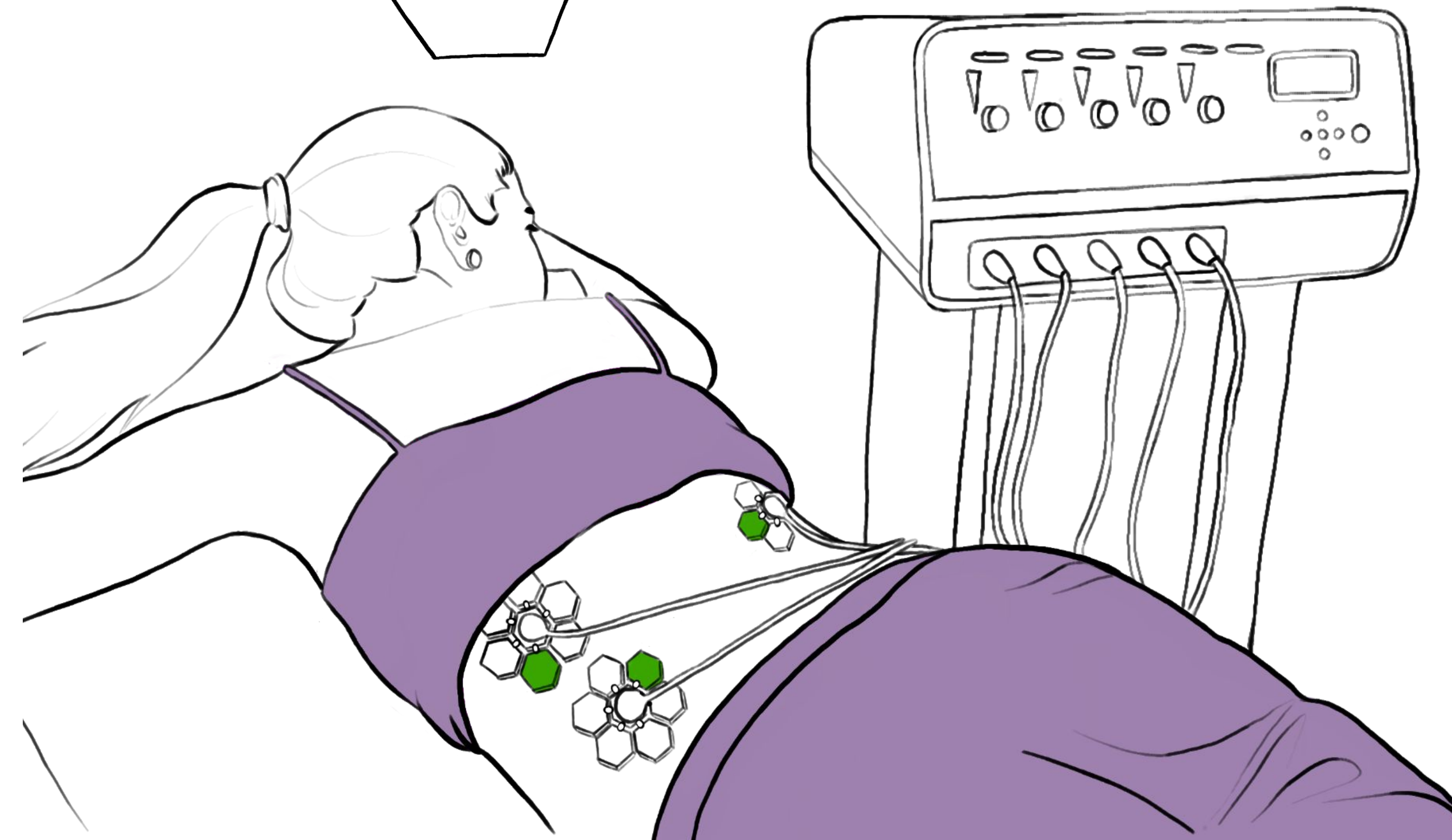
Opportunity

Chronic pain specialists performing Scrambler therapy need a solution that **reduces** time spent on **electrode placement** by **80%** in order to prevent delays in pain relief during the session.

Our Solution: The StarSwitch



Connects easily to the Scrambler Therapy machine



Shortens clinician learning process for electrode placement

Saves up to 20 minutes in electrode placement

Enhances placement accuracy across stimulation therapies

Lengthens effective session time

Proof-of-Concept

Computational Validation of patch voltage shows 8.74% bleedover within 4 mm of the stimulation site

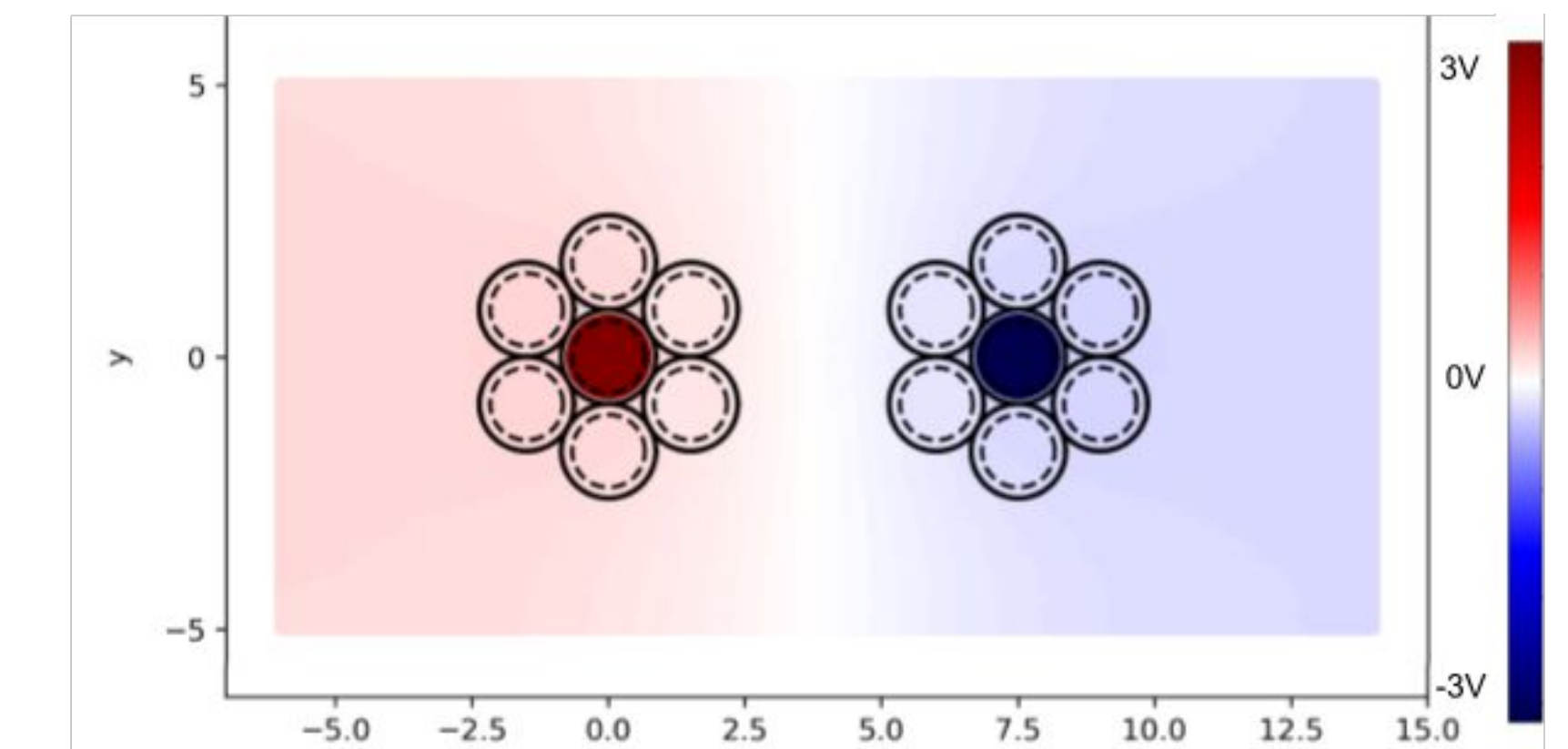


Figure 1: COMSOL simulation between stimulating patch and ground patch

✓ Voltage is confined within the simulation of the StarSwitch electrode array

Leakage across multiple iterations of the design is under 10%

Oscilloscope reading between input channel and StarSwitch



Figure 2A: Oscilloscope screen when reading voltage in channel shows no qualitative difference in signal from the TENS prototype.

Error derived from oscilloscope readings of voltage after 400 V peak-to-peak input.

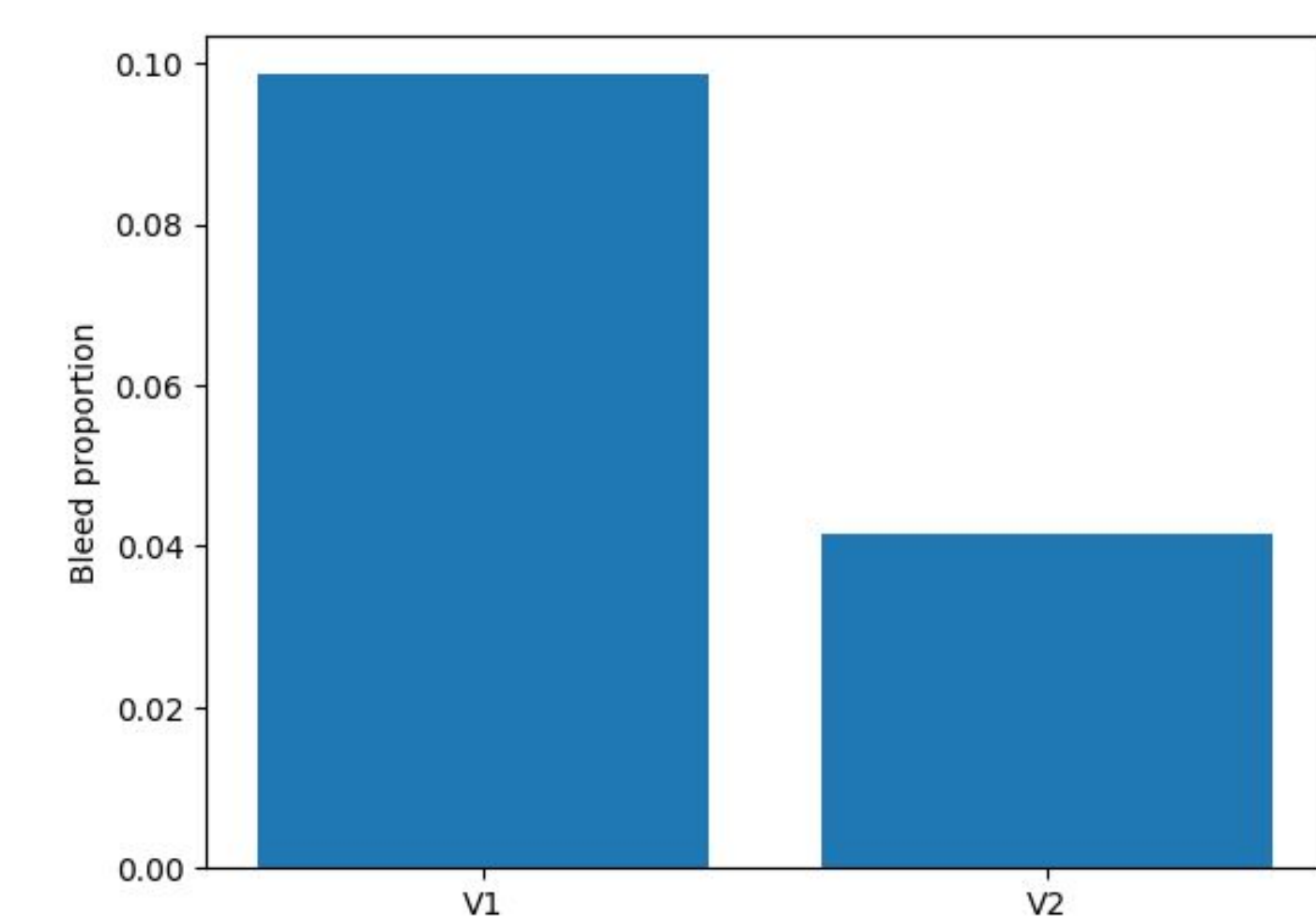


Figure 2B: X-axis: two iterations of StarSwitch prototype that were tested, Y: Variance relative to standard stimulation signal (V^2/s). Error bars were insignificant.

✓ The StarSwitch successfully transfers signal between channels with minimal leakage

References

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