Abstract Submitted
for the SES05 Meeting of
The American Physical Society

Modeling Electric Fields of Peripheral Nerve Block Needles.[1]
JAMES CH. DAVIS, NORMAN E. ANDERSON, MARK W. MEISEL, Dept. Physics, Univ. Florida, JASON G. RAMIREZ, F. KAYSER ENNEKING, Dept. Anesthesiology, Univ. Florida — Peripheral nerve blocks present an alternative to general anesthesia in certain surgical procedures and a means of acute pain relief through continuous blockades. They have been shown to decrease the incidence of postoperative nausea and vomiting, reduce oral narcotic side effects, and improve sleep quality. Injecting needles, which carry small stimulating currents, are often used to aid in locating the target nerve bundle. With this technique, muscle responses indicate needle proximity to the corresponding nerve bundle. Failure rates in first injection attempts prompted our study of electric field distributions. Finite difference methods were used to solve for the electric fields generated by two widely used needles. Differences in geometry between needles are seen to effect changes in electric field and current distributions. Further investigations may suggest needle modifications that result in a reduction of initial probing failures.

[1]This work was supported, in part, by the NSF through DMR-0305371 and the University of Florida University Scholars Program.

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Date submitted: 05 Aug 2005 Electronic form version 1.4