

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Simulations of fractal electronic circuits R.D. MONTGOMERY, M.S. FAIRBANKS, Department of Physics, University of Oregon, USA, S.A. BROWN, Department of Physics and Astronomy, University of Canterbury, NZ, R.P. TAYLOR, Department of Physics, University of Oregon, USA — Many natural structures make use of fractal geometry's inherent properties, which can include very high surface area to volume ratios, connectivity, and dispersion. Recent research and technological applications have begun to leverage these same properties in artificial structures including antenna and capacitor designs [1]. Here we present DC electrical simulations as a first step toward circuits in which the components themselves have fractal character. Our results show that such 'fractal circuits' produce complicated differential resistance curves (in response to a simple electrostatic gating scheme) that is unique to the underlying fractal geometry. Finally, we will discuss potential applications of these devices as well as candidate systems for fractal circuit fabrication.

[1] Cohen, N. L. *Communications Quarterly* Summer, 9 (1995).; Samavati, H., Hajimiri, A., Shahani, A. R., et al. *IEEE J Sol St Circ* 33 2035 - 2041 (1998).

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Date submitted: 18 Nov 2009

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