Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Fractal nanostructures with Hilbert curve geometry as a SERS substrate ILYA GRIGORENKO, CityTech, CUNY — A new type of substrates for Surface Enhanced Raman Scattering measurements is proposed. The shape of the substrate is based on self-similar fractal space filling curves, which possess properties of both one dimensional and two dimensional geometries. Here I present theoretical studies of the dielectric response of thin film doped semiconductor nanostructures, where conducting electrons are trapped in an effective potential having the geometry of the Hilbert curve. It is found that the system may exhibit the induced charge distributions specific for either two dimensional or one dimensional systems, depending on the excitation frequency. It is also shown that with the increase of the depth of the trapping potential the resonance of the system demonstrates a counter-intuitive shift to lower frequencies.

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Date submitted: 06 Nov 2012 Electronic form version 1.4