Abstract Submitted
for the APR11 Meeting of
The American Physical Society

Volume Spectrum from Bohr-Sommerfeld Quantization HAL HAGGARD, University of California, Berkeley, EUGENIO BIANCHI, Centre de Physique Théorique, Campus de Luminy, Marseille - France — As first observed by Roger Penrose, angular momentum vectors can be used to describe geometrical objects, such as convex polyhedra. A remarkable outgrowth of this idea is that spaces of geometrical shapes can be endowed with a phase space structure. This allows all the tools of dynamical systems and semiclassical mechanics to be explored in the context of geometrical shapes. From the perspective of discrete approaches to gravity, such as the Regge Calculus where space is chopped into tetrahedral pieces, this opens fascinating new prospects. Here we present a discrete spectrum for the volume of a tetrahedron as obtained from Bohr-Sommerfeld quantization. We discuss connections with Loop Quantum Gravity and the implications for approximate treatments of more complex geometries.

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Date submitted: 18 Jan 2011 Electronic form version 1.4