Date and Time: Friday, May 3, 2019 at 10am,

Location: Peters Business Building Room 428

Title: *On the Chaoticity of Uniformly Continuous Operator Semigroups and Their Generators*

Speaker: Jimmy Gonzalez, Master's Student, Department of Physics, California State University, Fresno. Research Advisor: Marat V. Markin, Ph.D.

Abstract: The role of dynamical semigroups in physics can hardly be overstated. For example, dynamical semigroups appear to be an important structure in studying open-system dynamics and chaotic behavior. The recently emerged and rapidly developing theory of linear dynamical systems studying chaotic linear operators and operator semigroups has potential applications to Physics. A natural question arises concerning a connection between the chaoticity of an operator semigroup and the chaoticity of its generator. In this talk, we use a spectral approach to provide a negative response to this question.

Date and Time: Friday, April 26, 2019 at 10am,

Location: Peters Business Building Room 428

Title: *Quantum Computing - History and Prospects*

Speaker: Dr. Vesselin G. Gueorguiev, Institute for Advanced Physical Studies, Bulgaria, Ronin Institute for Independent Scholarship, USA.

Abstract: The talk provides a general overview of the current status of the Quantum Computing industry. We briefly survey the history of computing and physics and how they are intertwined to lead to the idea of Quantum Computing (QC) and to the development of QC as a branch of Information Science. The key Quantum Concepts relevant to Quantum Computing and its applications are discussed. Current status of the hardware and software resources is outlined and main problems and future directions are pointed out.

Date and Time: Friday, March 29, at 10 AM

Location: PB 428

Title: *On the Non-hypercyclicity of Normal Operators and Collections of Their Exponentials*

Speaker: Edward Sichel

Abstract: Using a straightforward spectral approach, we demonstrate that, in complex Hilbert spaces, normal operators as well as certain collections of their exponentials are *non-hypercyclic*.

Date and Time: Friday, March 22, at 10 AM

Location: PB 428

Title: *On the Chaoticity of Rolewicz-Type Operators on Function Spaces*

Speaker: John Jimenez

Abstract: We discuss examples of chaotic bounded linear operators on certain function spaces similar to those originally found on sequence spaces by S. Rolewicz.

Date and Time: Friday, March 8, at 9 AM, and

Friday, March 15, at 10 AM

Location: PB 428

Title: *Geometry in Quantum Mechanics. Quantum Metric Tensor and Quantum Localization.*

Speaker: Ettore Vitali (Department of Physics)

Abstract: Two formidable challenges in Condensed Matter Physics are detecting metal-insulator transitions in correlated materials and detecting unconventional superconducting phases. We discuss a geometric approach, which relies on families of Hamiltonian operators that depend on external parameters. The introduction of a suitable metric in the Hilbert space of the system, different from the one generated by inner product, to describe the change in wave functions as we move through the parameter space, naturally leads to the definition of the quantum metric tensor. We show that this definition opens the possibility to introduce a ground state expectation value that allows us to distinguish between an insulator and a conductor, without the need of computing the excited states. We also discuss the possible implications in the realm of the theory of unconventional superconductors.

Date and Time: Friday, March 1, at 10 AM

Location: PB 428

Title: *On the Chaoticity of Rolewicz Type Unbounded Operators*

Speaker: Marat Markin

Abstract: We discuss the concepts of *hypercyclicity* and *chaoticity* of linear operators, central for modern and rapidly developing theory of linear dynamical systems, and provide a

natural unbounded generalization of the classical Rolewicz's weighted backward shift chaotic bounded linear operators.