

SEMINAR NOTICE

*Department of Physics and Engineering Physics
University of Saskatchewan*

SPEAKER: Alex Palameta, PhD Candidate
Physics & Engineering Physics

TOPIC: *Meson-Hybrid Mixing in Vector Heavy Quarkonium for QSD Sum Rules*

DATE: February 5th, 2019

TIME: 3:30-4:30 p.m.

PLACE: Physics 103

ABSTRACT:

The strong nuclear force binds quarks together inside nucleons (protons and neutrons) and other strongly interacting particles, i.e., hadrons. Until recently, all observed hadrons were either thought to be baryons (three quarks) or mesons (a quark and an antiquark), collectively known as quark-model hadrons. Here we explore the possible existence of outside-the-quark-model hadrons, that is to say, hadrons with quark configurations other than three quarks or a quark antiquark pair.

After a brief review of some key concepts in modern particle physics, including an introduction of hadrons, I will present our research. In this work we use QCD Laplace sum-rule and a multi-resonance analysis methodology to explore the possibility of meson-hybrid mixing in vector heavy quarkonium. Our cross-correlator calculation supplements the perturbative result with non-perturbative contributions proportional to the four-dimensional and six-dimensional gluon and quark condensates. We then use experimentally determined hadronic masses to build several single and multi-resonance models of the charmonium and bottomonium mass spectra. These models and the QCD Laplace sum-rule are then used to test resonances for meson-hybrid mixing. Finally, we will discuss our results which indicate significant meson-hybrid mixing in several of the resonances we have tested.

Coffee and Cookies will be served in Physics lounge at 3:00 p.m. for those attending the seminar.