CCSU

DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, November 21, 2014
2:00 – 3:00 PM
Maria Sanford, Room 101

LAPLACE'S NEBULAR HYPOTHESIS

SERGEI ARTAMOSHIN

CENTRAL CONNECTICUT STATE UNIVERSITY

(Joint work with Vasily Yanchilin)

Abstract: Recall that, according to the nebular hypothesis, stars form in massive and dense clouds of molecular hydrogen — giant molecular clouds (GMC). These clouds are gravitationally unstable, and matter coalesces within them to smaller denser clumps, which then rotate, collapse, and form stars. The protoplanetary disk is an accretion disk that feeds the central star. Initially very hot, the disk later cools in what is known as the T tauri star stage; here, formation of small dust grains made of rocks and ice is possible. The grains eventually may coagulate into kilometer-sized planetesimals. If the disk is massive enough, the runaway accretions begin, resulting in the rapid—100,000 to 300,000 years—formation of Moon- to Mars-sized planetary embryos. Near the star, the planetary embryos go through a stage of violent mergers, producing a few terrestrial planets. The last stage takes approximately 100 million to a billion years.

In this presentation, we criticize this Laplace's hypothesis by showing that protoplanetary disc may not collapse to a planet. This statement follows from the following basic result we are going to proof.

For satellites with circular orbit, the orbit of joint energy is always below the orbit of joint impulse momentum.

The presentation should be accessible for everybody who took Calculus I.

For further information:
gotchevi@ccsu.edu 860-832-2839
http://www.math.ccsu.edu/gotchev/colloquium/