

*The Lafayette College Physics Club Presents ...*

## **Orbital Stability of Earth-Like Planets in Exoplanetary Systems**

**Suman Satyal, Ph.D.**

Department of Physics, University of Texas at Arlington

**Friday, April 10, 2015 at 12:00 p.m.**

Gagnon Lecture Hall

Hugel Science Center



*Artist's impression of GJ 832c*

The study of exoplanets has made a significant leap since the first planet around a solar type star, 51 Pegasi b (Mayor & Queloz 1995), was discovered almost two decades ago. The number of confirmed exoplanets has already surpassed most peoples' expectations with a count of 1906 as of April 1, 2015. New exoplanets are being added everyday into the database which has also raised the number of terrestrial planets. After all, the ultimate conquest of the contemporary exoplanet research is to find a planet within its respective habitable zone with conditions to support life. Since long-term orbital stability of planets is one of the criteria for life to develop, the study of the exoplanets in terms of orbital dynamics is considered vital.

In this talk, I will briefly mention current exoplanetary research activities which include orbital dynamics. Then the results of our studies from the long-term orbital stability of the planets around GJ 832 with an emphasis on a potential Earth-like planet will be presented. GJ 832 is an M type star that is known to host two planets, GJ 832c (inner) and GJ 832b (outer). Various phase space analyses for inner planet will be performed to confirm its stability. Also, stability of an Earth-mass planet injected in between the inner and outer planets will be discussed in terms of its lifetime and eccentricity evolution. Finally, the planet's habitability in the stellar habitable zone that extends from 0.13 AU to 0.28 AU will be reviewed.

**Free Lunch and Drinks**