

# **ASTRONOMY SEMINAR**

May 12, 2011

Speaker : Dr. Daniele Malafarina  
DAA-TIFR

Title : Gravitational collapse of perfect fluids: A review  
of Outstanding Problems and Recent Results

Day, Date & Time : May 24, 2011 (Tuesday) at 1600 hrs

Venue : Lecture Theatre (AG-66)

(A. Gopakumar)

## *Abstract*

*Massive stars undergo complete gravitational collapse, under the force of their own gravity, at the end of their life cycle, when their internal nuclear fuel is exhausted.*

*We discuss and investigate here such a continual gravitational collapse of a massive spherical body, composed of a perfect fluid. This is a crucial physical process in relativistic astrophysics. The aim is to study gravitational collapse final stages, which typically result in the formation of black holes and naked singularities end states.*

*An important, currently open, issue in the field is to understand clearly what are the physical circumstances that determine the collapse final states as black holes and when naked singularities can occur.*

*After a brief review we present recent results and the formalism that can be used to describe the last stages of the life of a massive matter cloud such as a star, and possibly to model the behaviour of supermassive compact object that exist at the center of galaxies.*

*A very important issue in this connection is the genericity of naked singularities, when they occur as collapse final states. We show that naked singularities are generic end states of complete perfect fluid collapse.*