

**DEPARTMENT OF ASTRONOMY & ASTROPHYSICS**

**ASTRONOMY SEMINAR**

November 8, 2010

Speaker : Prof. Deepto Chakrabarty  
MIT, USA

Title : X-ray Timing of Compact Stars:  
Recent Progress and Future Opportunities

Day, Date & Time : Tuesday, 16 November, 2010 at 16.00 hrs

Venue : Lecture Theatre (AG-66)

(J.S. Yadav)

***Abstract***

*I will begin by discussing the spin and magnetic evolution of millisecond pulsars as an application of X-ray timing. Recycled pulsars in low-mass X-ray binaries are old neutron stars which have been spun up to rapid rotation by magnetic accretion torques. They are among the most rapidly spinning stars known, with surface velocities of order  $0.1c$ . However, their spin distribution, as observed by the Rossi X-Ray Timing Explorer (RXTE), cuts off sharply above 750 Hz, well below the presumed centrifugal break-up limit for neutron stars. The radio pulsar population exhibits a similar cutoff. A variety of braking mechanisms may contribute, including magnetic accretion torques, magnetic dipole radiation, and even gravitational radiation from the rapidly spinning star. I will discuss this area as well as other recent highlights from X-ray timing of compact stars. Finally, I will review future scientific opportunities in X-ray timing afforded by India's ASTROSAT as well as mission concepts being studied in the U.S. and Europe.*