

## SEMINAIRE du Service d'Astrophysique



**POWER SPECTRA OF BLACK HOLES AND NEUTRON STARS AS A PROBE OF HYDRODYNAMICAL STRUCTURE OF THE SOURCE. DIFFUSION THEORY AND ITS APPLICATION TO X-RAY OBSERVATIONS OF COMPACT OBJECTS (BLACK HOLES AND NEUTRON STARS)**

**Lev Titarchuk**

(George Mason University/US Naval Research Laboratory, Washington, USA)

**Mardi 13 février 2007**

**11h00**

*I present a model of Fourier Power Density Spectrum (PDS) formation in accretion powered X-ray binary systems derived from the first principles of the diffusion theory. The resulting PDS continuum is a sum of two components, a low frequency (LF) component is presumably originated in an extended accretion disk and a high frequency (HF) component is originated in the innermost part of the source (Compton cloud).*

*The LF PDS component has a power law shape with index about 1.5 at higher frequencies ("red" noise) and a flat spectrum below a characteristic (break) frequency ("white" noise). This white-red noise (WRN) continuum spectrum holds information about physical parameters of bounded extended medium, diffusion time scale and dependence of viscosity vs radius.*

*I present a method to measure an effective Reynolds number,  $Re$  using the basic PDS parameters (PDS index and characteristic frequencies). The inferred  $Re$  using the best-fit parameters of PDS is in the range of  $8 \pm 2.5$ .*

**Ce séminaire aura lieu au CEA Saclay - Orme des Merisiers - bâtiment 709, Salle 220.**