

SEMINAIRE régulier du Service d'Astrophysique



Spectra of the accreting neutron stars boundary layers in the spreading layer model

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Firstly I will introduce the physics of neutron stars and of accretion into close binary systems. I will give special attention to low mass X-ray binaries (LMBXs). Spectra of high luminosity LMBXs can be presented by two black body components. The hard component may be associated with radiation of a boundary layer. The different models of the boundary layers are considered with special remark to model of boundary layer as a spreading layer. Spectra of the spreading layers on the neutron star surface are calculated on the basis of the Inogamov-Sunyaev model taking into account general relativity correction to the surface gravity and considering various chemical composition of the accreting matter. Local (at a given latitude) spectra are similar to the X-ray burst spectra and are described by a diluted blackbody. Total spreading layer spectra are integrated accounting for the light bending, gravitational redshift, and the relativistic Doppler effect and aberration. They depend slightly on the inclination angle and on the luminosity. These spectra also can be fitted by a diluted black body with the color temperature depending mainly on a neutron star compactness. Owing to the fact that the flux from the spreading layer is close to the critical Eddington, we can put constraints on a neutron star radius without the need to know precisely the emitting region area or the distance to the source. The boundary layer spectra observed in the luminous low-mass X-ray binaries, and described by a blackbody of color temperature $T_c \sim 2.4$ KeV, restrict the neutron star radii to $R \sim 14.8$ km (for a $1.4 M_{\text{sun}}$ star and solar composition of the accreting matter), which corresponds to the hard equation of state.



Un café sera servi 15 minutes avant le séminaire

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