Département d'Astrophysique

Séminaires du DAp

Jeudi 29/11/2012, 11:00

Bat 713, salle de séminaires Galilée , CEA Saclay, Orme des Merisiers

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CfA, Harvard, USA

X-RAY EMISSION FROM STAR-FORMING GALAXIES

Star-forming galaxies provide us with a unique and complete insight on several aspects of X-ray astrophysics, from the accretion processes into compact objects to the emission mechanisms from the hot inter-stellar medium (ISM).

I will report on recent results of a comprehensive multi-wavelength study of nearby star-forming galaxies and their importance for understanding the star formation activity at large redshifts.

Based on Chandra, Spitzer, GALEX and 2MASS archival data, populations of high-mass X-ray binaries (HMXBs) and the X-ray emission from the diffuse hot gas were investigated in relation to the properties of the host galaxies. HMXBs are a good tracer of the recent star formation activity in their host galaxy. Their collective luminosity and number scale with the star formation rate (SFR). The HMXB luminosity function was derived, modeled and interpreted with a statistical accuracy that exceeded by far that achieved in any of the previous studies. This allowed to find evidence for a high luminosity break at the Eddington luminosity of a ~100 Msol black hole.

The apparent luminosity of the diffuse emission in the 0.5–2 keV band linearly correlates with the star formation rate. In average ~30−40% of the scale factor is likely produced by faint compact sources of various types.

The investigation of an additional sample 27 late-type galaxies from the Chandra Deep Fields shows that there are no statistically significant trends in the Lx/SFR ratio with the redshift, up to z~1.3, or with the star formation rate itself.

I will also show preliminary results of an ongoing project that introduces a brand new technique for studying the X-ray binary populations in greater details, based on spatially-resolved SFR and stellar mass surface density maps.

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