СОФИЙСКИ УНИВЕРСИТЕТ
ФИЗИЧЕСКИ ФАКУЛТЕТ

ФАКУЛТЕТЕН СЕМИНАР

четвъртък, 09.05.2019 г., 16:15 ч., зала А415

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Nature of ultraluminous X-ray sources

The origin of ultraluminous X-ray sources (ULXs) in external galaxies whose X-ray luminosities exceed those of the brightest black holes in our Galaxy by hundreds and thousands of times is mysterious. Their X-ray spectra indicate a presence of hot winds in their accretion disks. Recently, ULX-pulsars and high-velocity outflows up to 0.2c have been discovered. They are in accordance with the super-Eddington accretion. Here we analyze the variability properties of the only five ULXs which show flat-topped noise (FTN) and quasi-periodic oscillations (QPO) in their X-ray power density spectra. In each ULX the mass accretion rate may vary up to 3-4 times, and with decreasing the accretion rate (reduction the spherization radius), the hardness ratio and luminosity increase, FTN and QPO may dissapear. We may potentially measure the black hole masses using X-ray luminosities. However, the strongest evidences come from optical spectroscopy. The spectra of the ULX counterparts are very similar to that of SS433 and WNL type (late nitrogen Wolf-Rayet stars) or LBV (luminous blue variables) in their hot state. We find that the spectra do not originate from WNL/LBV type donors but from strong winds in the accretion disks, which have similar physical conditions as the stellar winds from these stars. The results suggest that the bona-fide ULXs have supercritical accretion disks.