Evidence for supermassive black holes at the centers of nearby *non-active* galaxies, based on some most unusual X-ray observations

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[Contributed talk, 15min.]

Abstract

Giant-amplitude, non-recurrent X-ray flares have recently been observed from several non-active galaxies (e.g., Komossa & Bade 1999). All of them share some rather exceptional properties, namely: huge peak luminosity (up to $\sim 10^{44}$ erg/s), huge amplitude of variability (up to a factor 200), and extreme X-ray softness. Remarkably, we do *not* find any signs of Seyfert activity in the optical spectra of these galaxies.

A review of these observations and new multi-wavelength observational and theoretical results on several of the flaring galaxies are presented, as well as a search for further X-ray flares from a sample of $\sim$140 nearby active and non-active galaxies.

We rigorously explore AGN scenarios to account for the unusual X-ray outbursts from the optically 'normal' galaxies and find AGN-related models highly unlikely. New consistency checks of the previously favored scenario – tidal disruption of a star by a supermassive black hole at the center of each of the outbursters – are presented and we conclude that this scenario provides the best explanation for the X-ray observations.

These observations open up a new window to detect and investigate supermassive black holes and their immediate environment in non-active galaxies. The temporal evolution of the flare spectral features will depend on relativistic precession effects around the Kerr metric, allowing to probe the realm of strong gravity.

Prospects for finding further of these outstanding flaring sources with next generation sky surveys, like the one planned with the *LOBSTER* ISS X-ray all-sky monitor, are discussed, as is the importance to perform rapid follow-up observations with *Chandra* and *XMM*.

CATEGORY: NORMAL GALAXIES