The shape of the K_α line as the evidence of the BH's existence in Seyfert galaxies

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Abstract

Observations of Seyfert galaxies in X-ray region reveal the wide emissive lines in their spectra, which can arise in inner parts of accretion disks, where the effects of General Relativity (GR) must be counted. A spectrum of a solitary emission line (the K_α-line of iron, for example) of a hot spot in Kerr accretion disk is simulated, depending on the radial coordinate r and the angular momentum $a = J/M$ of a black hole, under the assumption of an equatorial circular motion of a hot spot. Basing on results of numerical simulations it is shown that the characteristic two-peak line profile with the sharp edges arises at a large distance, (about $r \approx (3-10)r_g$). The inner regions emit the line, which is observed with one maximum and extremely wide red wing. High accuracy future spectral observations, being carried out, could detect the angular momentum a of the black hole.