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LINE SHIFT IN ACCRETION DISKS - THE CASE OF Fe Kα

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A broad emission line Fe Kα at 6.4 keV has been observed in a number of type 1 Active Galactic Nuclei (AGN), and in most cases its width corresponds to the velocities on the order of tens of thousands kms^{-1}, reaching sometimes even one third of speed of light. Therefore, the line is most likely produced in a very compact innermost region of accretion disk around a central supermassive black hole (SMBH), where the emitting material rotates with relativistic velocities. In addition to its large width due to kinematic effects, another interesting feature of the Fe Kα line is its asymmetric profile with two peaks - a narrow bright blue one and a wide faint red one. Such profile is most likely a result of combination of the following effects: classical Doppler shift (responsible for occurrence of two peaks), special relativistic transverse Doppler shift and Doppler beaming (responsible for much brighter blue peak in respect to the red one), as well as general relativistic gravitational redshift (responsible for smearing the "blue" emission into the "red" one). Besides, in case of SMBH binaries, their Fe Kα line emission could arise from both accretion disks around primary and secondary SMBHs, and hence, the corresponding observed line profiles could be affected by Doppler shifts due to radial velocities of the components in such a binary system. Here we present a short overview and main results of our investigations of the Fe Kα line emission from relativistic accretion disks around single and binary SMBHs, obtained by numerical simulations based on ray-tracing method in Kerr metric. According to these results, both Doppler and gravitational shifts could have significant influence on the profile of the broad Fe Kα line.