Magnetized relativistic disk-jet equilibrium structure formation with the effect of photon gas

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We studied the problem of relativistic disk-powerful jet equilibrium structure formation applying the Beltrami-Bernoulli equilibrium approach [1-2]. Accretion disk is magnetized and consists of electron-ion plasma and photon gas. For three fluids we wrote modified relativistic equations [3]. We consider the photon gas viscosity as a main source of accretion. An effective local α-viscosity model is used for the background pressure [4, 2]. In the local approximation, when the expansion is neglected, we constructed the analytical solutions for characteristic parameters of the disk-jet equilibrium structure (velocity field, generalized vorticity, pressure, magnetic field and current) for the minimal model, when the variations for photon gas density are ignored as well as the Hall term is taken to be zero. Direct dependence of the final parameters on the background pressure, as well as on the deviation from it and on the photon gas density is evident. The magnetic field is expected to affect the collimation of the jet.

References

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