Title: ON THE POSSIBILITIES OF SHOCKS IN RELATIVISTIC ACCRETION AND WIND FLOWS.

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Abstract: In the present study, we investigate the possibilities of shocks in the accretion/wind flows. For the constant ultra-relativistic adiabatic index ($\gamma = 4/3$), shocks are possible because of the presence of the two saddle type sonic points in the flow. However, in the case accretion flows matter remains cool (non-relativistic i.e., $\gamma = 5/3$) at the outer boundary and becomes very hot (extreme relativistic and $\gamma = 4/3$) at the inner edge, the smooth variation of $\gamma$ from 5/3 to 4/3 (outer to inner) needs to be taken into account while solving the hydrodynamic equations. In our recent study, we find that except for the region very nearby the compact object, $\gamma$ does not change significantly from its non-relativistic value (which was opposite to the previous study) and therefore, the EOS mostly remains non-relativistic in nature. Employing this relativistic equation of state (EOS) (Synge 1957) in which the adiabatic index varies (4/3 to 5/3) from the non-relativistic to relativistic regime with temperature we notice that number of the saddle type sonic point reduces to one indicating that the formation of shocks in the flow becomes unlikely.