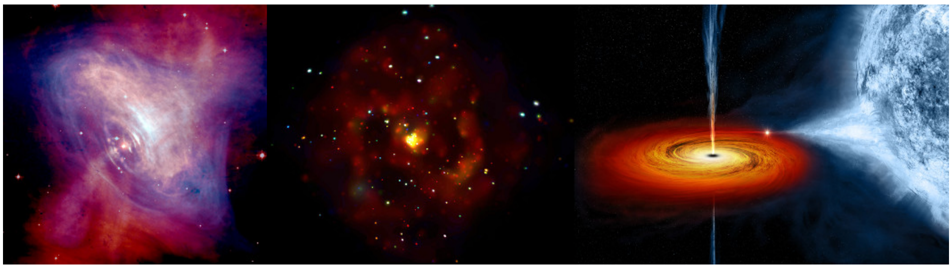

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Numerical simulation of radiatively driven jets around black holes.

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The central engine in active galactic nuclei (AGNs) and microquasars
is a black hole. As the black hole does not have any hard surface the jet must originate from the inner part of the accretion disc. The radiation field of the accretion disc interacts with the jet material as the jet travels through the radiation field. Various steady-state investigations have shown that the radiation field can play a crucial role in the acceleration and collimation of the jets. It can also produce steady shocks very close to the jet base. However, the numerical simulations of the radiatively driven jets are very limited. Hence, in order to bridge this gap we perform the numerical simulations of jets under the influence of the radiation field of the accretion disc. Along with the relativistic equations of motion we use a relativistic equation of state (EoS) for multispecies fluid which enables us to study the effect of composition on jet dynamics. Our results show that starting from very low injection velocities, the jets can achieve high Lorentz factors. The composition of the jet plasma significantly influences the acceleration process. For sub-Eddington luminosities, lepton-dominated jets can be accelerated to ultra-relativistic Lorentz factors while the electron-positron jets need super-Eddington luminosities to achieve relativistic terminal Lorentz factors.

Presentation Type

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