Contribution ID: **38** Contribution code: **TRANS/MWL/MM/DM** Type: **Poster**

Exploring the impact of electromagnetic dissipation on ultrarelativistic plasma outflows

Wednesday 4 September 2024 08:05 (1 minute)

Ultra-relativistic plasma outflows are intrinsically connected with gamma-ray bursts. Over the years, a large number of analytical and numerical works has been devoted to understanding the intricacies of their complex dynamics, with most of these past studies performed in the ideal MHD regime. We propose a self-similar formalism, based on the expansion of the equations of resistive relativistic magnetohydrodynamics, for the description of these outflows in the vicinity of their symmetry axis and present semi-analytical solutions describing strongly relativistic jets in both the ideal and resistive MHD regimes. Our solutions provide a clear picture of the impact of electromagnetic dissipation on the acceleration and collimation mechanisms which determine the kinetic and morphological characteristics of these relativistic outflows. The resistive MHD solutions are compared to their ideal MHD counterparts, revealing the key differences between the two regimes. Our comparative analysis sheds light on the possible role of electromagnetic dissipation in shaping the dynamics of the ultra-relativistic outflows associated with gamma-ray bursts.

Primary author: LOULES, Argyrios (National and Kapodistrian University of Athens)

Co-author: Prof. VLAHAKIS, Nektarios (National and Kapodistrian University of Athens)

Presenter: LOULES, Argyrios (National and Kapodistrian University of Athens)

Session Classification: Poster hang