Plasma Structures of Astrophysical Jets Unraveled*

P.S. Coppi[1] and B. Coppi[2]
[1]Yale Un., [2]MIT

The theoretical finding of plasma structures propagating away from disks associated with binary systems [1] has led to propose that an important class of the jets observed in astrophysics are the results of the emission of these structures. Double-helix structures were in fact identified, in one case, as a result of non-linear interactions [2] of modes excited in circumbinary disks sustained by pairs of stellar black holes [2]. The other considered case is that of a massive black hole paired with a much lighter "sheperd" black hole that is proposed to be relevant to an important class of observed jets. According to the theory, the emitted plasma structures are associated with the fluctuations generated by the carving of a "swept torus" [2] by the sheperd black hole in the plasma disk sustained by the main black hole. In fact, a following analysis of the observed M87 Jet structure [3] had led to conclude that this was of a double-helix kind. More recent studies of other jets [4,5] associated with massive black holes have identified helical or different plasmas structures associated with them. *Sponsored in part by the Kavli Foundation.

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