

The Production of Variable Cosmic Jets

David L. Meier

and

Masanori Nakamura

Jet Propulsion Laboratory,
California Institute of Technology

I will review recent progress in the theory of relativistic jet production. The presently-favored mechanism is an electrodynamic one, in which charged plasma is accelerated by electric fields that are generated by a rotating magnetic field. The most pressing issues of current interest are understanding what factors control the jet power, its speed, its degree of collimation, and its stability, and how these properties determine the type of jet observed and its effect on its environment.

Intraday variable sources show a strong indication of having a jet that is both highly compact and highly relativistic, with an axis that is oriented very close to the line of sight. Such sources allow us to probe the conditions necessary for the production of cosmic jets that occur very close to the black hole in the system. The data point to jets that have several components --- a moderately relativistic flow surrounding a highly relativistic spine. This has important implications for theories on how jets might be produced by accreting black hole systems.