IMPORTANT QUESTIONS IN THE FIELD OF DISSIPATION OF JETS

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Abstract

Sometimes the most important step toward making scientific progress is figuring out the correct question to ask. Discussion leaders at the X-Ray and Radio Connections Meeting were asked to create a list of important questions in each field which, if we worked on them and met again in five years, we would have made progress on the issues presented at the meeting. Here are the important questions for dissipation of jets.

Questions

We are hampered in addressing jet dissipation if we are unclear as to jet composition and origin. The following questions encompass these issues, together with the dissipation of jet energy.

1) What is the origin of the magnetic field?

2) What keeps jets collimated?

3) What type of plasma produces the jet structures we observe – electron-positron or electron-proton?

4) Which particles (protons or electrons?) are the primary ones accelerated in different parts of a jet? What are the acceleration processes?

5) Do we have the beaming factors and dominant energy loss processes correct? Are we correctly locating acceleration sites?

6) Which structures are primarily dynamical and which have reached an equilibrium?

7) Are there situations in which large departures from minimum energy are predicted and/or detected?

8) What stops jets in cases where steady entrainment is not important? How gradual is the deceleration?

9) Are we accurately calculating the total energy (particles, fields, dynamical) in jets?

10) What processes are most important in transferring jet energy to the surrounding medium? Where and on what time scales is the energy deposited?