

Chapter 1

Objectives

The overall goals of this project were four-fold:

1. To study the fundamental processes of energetic particle transport in turbulent magnetic fields.
2. To study the transport, acceleration, and interactions of solar energetic particles.
3. To study the transport, time variations, and interactions of galactic and extragalactic cosmic rays.
4. To provide Thai-language information on space physics and astrophysics to the public, and to expose students to space physics research and research techniques.

Our activities are schematically indicated in Figure 1. The activities and results of our work are presented in the following sections, each section corresponding to one of these objectives.

It will be seen that the number of lines of research that we have undertaken is greater than the number that have produced papers in international journals. In part, this is because of a time lag - some ideas developed during the course of this project will eventually lead to a publication. In part, it is because some lines of work have been terminated. This was anticipated in our research proposal, when we wrote that “there is a sort of Darwinian selection process as to which actually ‘survive,’ producing the most important results and most worthy of spending time to prepare an article for a major journal.” It is key to our research philosophy to produce high-impact output – both in terms of publishing in journals with a high impact factor, and in terms of the number of citations thereafter, indicating an impact on the field. To accomplish that with limited manpower (especially manpower for writing international journal articles), it is crucial to redirect our efforts only to work that is most promising for producing novel results of substantial interest to the community. At the same time, it is important for our “intellectual health” (and for training students) to try new ideas for a while, even if we ultimately do not pursue them to the level of an international journal article.

The principal investigator was intimately involved in all work by our group; specific contributions by others are noted below. All Thai research collaborators are listed, even if they are not official participants in this project (in which case their affiliation is listed in parentheses). Output numbers correspond to the numbered list of output in Section 7 and the Attachment numbers. Note also the cross-referencing between these categories of work and between individual sub-projects, indicating the strong synergy when performing these four categories of work in the same overall research project.

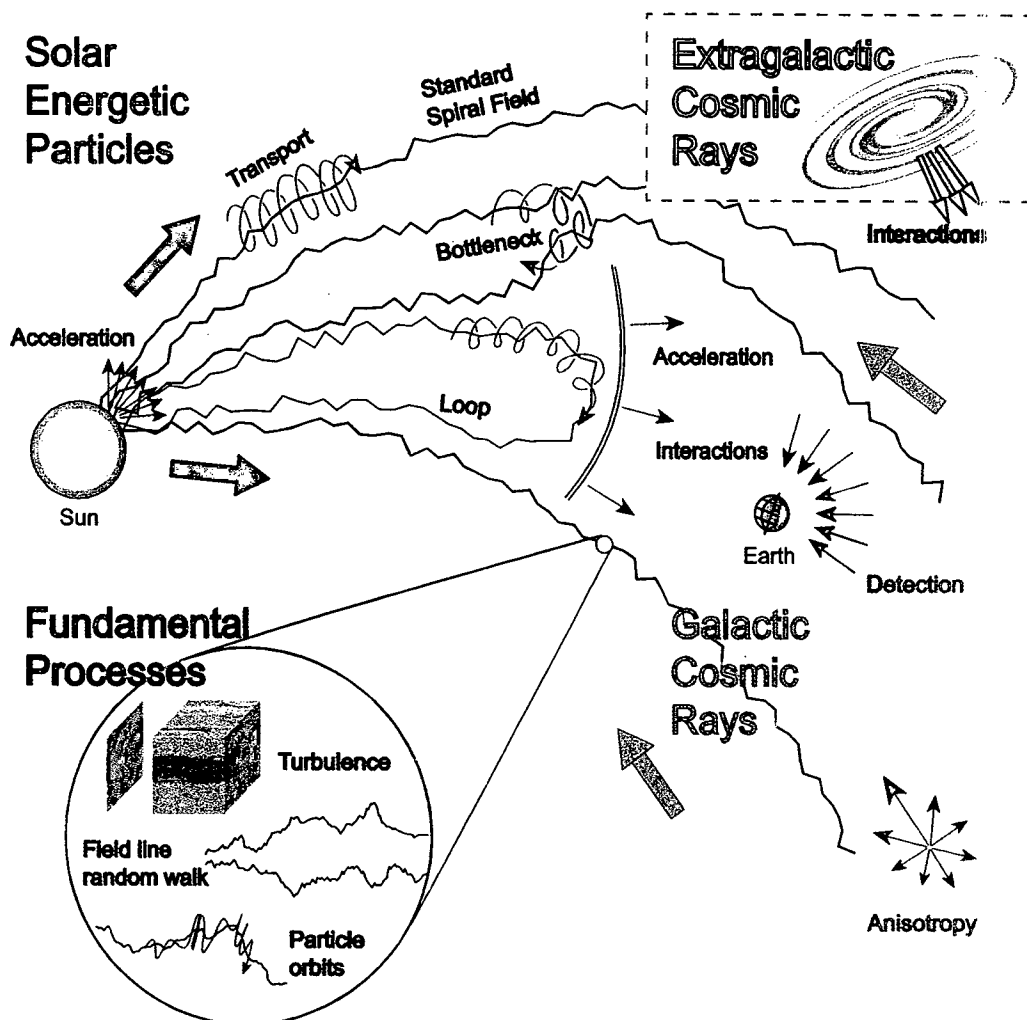


Figure 1: Illustration of the topics of this research project: 1. Magnetic turbulence, 2. Solar energetic particles, 3. Galactic cosmic rays, and 4. Dissemination and understanding of information on space weather. The solid lines refer to magnetic field lines, while arrows indicate particle motion.