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Future of Space Plasma Physics: Sensing the Universe with Material Particles

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The birth of Space Physics could be dated back to the ancient studies of aurorae, or to the discovery of a solar flare in the middle of 19th century. The rapid progress of Space Physics, however, occurred after the start of direct observations which were kicked-off during the IGY period. In situ observations of fields and particles are key for the detailed studies of earth/planetary magnetosphere as well as the heliosphere. This methodology contrasts with that in the neighboring field, astronomy, where the photon detections are the main method.

Cosmic ray particle observation, on the other hand, becomes more and more important in the study of nonthermal universe. Since it is believed that the plasma processes play the essential roles in accelerating cosmic ray particles, there are many common topics between cosmic ray physics and space physics.

In this talk, I would like to talk about the future direction of space physics based on these common topics.