



ACE

<http://www.srl.caltech.edu/ACE/>

*Launched:  
August 25, 1997*

## **Advanced Composition Explorer**

### ***Kit Item***

Cosmic and Heliospheric Learning Center business cards

### ***Mission***

ACE is studying energetic particles coming from the Sun, interplanetary space, and the Galaxy, collecting data to help us understand the composition of the Universe and the chemical evolution of matter. The particles from the Galaxy are galactic cosmic rays (GCRs), one of the few direct samples of matter from outside our Solar System. GCRs flow into our Solar System at nearly the speed of light, and are primarily atomic nuclei from which all of the surrounding electrons have been stripped.

### ***Education and Public Outreach Program***

It is difficult to take pretty pictures of cosmic rays, but studying the quantity and type of these particles helps us to understand their origin and history. This science lends itself well to helping students and the public to better understand topics such as composition, acceleration, magnetic fields, and energy. The Cosmic and Heliospheric Learning Center web site covers these topics. It also includes a glossary, a history of cosmic ray studies, and answers to hundreds of questions from readers. ACE developed this website along with many educational briefs and investigations, a booklet, a poster, and a science fact sheet. The ACE team initiated the development of a traveling museum exhibit as well as a CD-ROM with information on several NASA/Goddard Space Flight Center missions. It has contributed to many teacher and student workshops, and one of the team scientists routinely speaks about ACE science in the classroom to students from elementary through high school.

EPO site: <http://helios.gsfc.nasa.gov/>

### ***Seeing and Exploring the Universe***

ACE is measuring the composition of GCRs, as well as the composition of energetic particles from the Sun and interplanetary space. By comparing the composition of these different samples of matter, ACE will further our understanding of the origin of the heavy elements in our Solar System and the Galaxy. GCRs are also an important component of the energetics of the Galaxy, but how they have obtained their high energies is not well understood. ACE has already shown that there is a long (>100,000 years) delay between the time of creation of the GCR elements and when they are accelerated up to high energy. Also, the composition of the heavy GCRs is surprisingly similar to that of the Solar System, which raises interesting questions about the chemical evolution of the Galaxy.

*Cosmic rays are  
the nuclei of atoms such as hydrogen, helium, etc. ACE detects cosmic rays traveling at speeds up to 85% that of light.*