

## Experiment on Fermi acceleration by an oscillating potential wall

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Fermi acceleration has been considered as an acceleration mechanism for cosmic rays and is related with wave-particle interaction. Landau damping is one of the examples of wave-particle interaction from the viewpoint of wave behavior and is accompanied by particle acceleration, as which one may refer to the same wave-particle interaction from the viewpoint of particle behavior. As for the plasma experiments on wave-particle interaction, the increase of electron or ion temperature has been observed with wave damping. It is because collisions between particles are frequent and cause thermalization of particles' energy in most experiments. Thus, direct observation of particle acceleration is very difficult. However, in some experiments on plasma turbulence, change of particle's energy distribution functions has been observed. Nevertheless, the relation between plasma turbulence and particle acceleration is not clear, since the control of the plasma turbulence is almost impossible.

In order to observe particle acceleration due to time-varying electric field and to investigate its details experimentally, an experimental system, where electrons move along a magnetic field back and forth between an oscillating potential wall and a fixed potential wall, has been constructed. In the system, it has been successfully investigated that (1) the relation of particle's bounce frequency with the frequency of the oscillating potential wall and (2) the relation of electron's acceleration energy with number of its bouncing times.