



ÖSTERREICHISCHE  
AKADEMIE DER  
WISSENSCHAFTEN

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VICTOR FRANZ HESS-FORSCHUNGSZENTRUM  
VORTRAGSSAAL U.A.4 (UNTERGESCHOSS)  
SCHMIEDLSTRASSE 6, 8042 GRAZ



EINLADUNG ZUM VORTRAG

# ALFVÉN WAVES AND THE AURORA

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The aurora is produced by the impact of energetic electrons and protons on the high-altitude atmosphere. How these particles become energized and accelerated toward the Earth is a subject of ongoing research. The ultimate energy source for the aurora on Earth is the interaction of the solar wind with the Earth's magnetosphere, the region in which the geomagnetic field controls the dynamics. However, satellite observations show that the auroral acceleration process occurs rather close to Earth, at altitudes of about 6000 km. The energy from the solar wind-magnetosphere interaction is carried to the acceleration by Alfvén waves. The Alfvén waves are guided along the magnetic field, making a natural transmission line that carries energy toward the Earth. Auroral particle acceleration takes on at least two different forms: a quasi-static acceleration that produces electrons of nearly constant energy, and a dynamic acceleration process that produces a broad spectrum of waves. This latter form is now known to be associated with direct acceleration of the particles by the Alfvén waves. The aurora is also seen on other planets, most notably at Jupiter, where the auroral acceleration processes are now being observed by NASA's Juno satellite in polar orbit around Jupiter. The Juno observations show some similar features to those at Earth but also some intriguing differences. Study of the aurora in these different environments is leading to a better understanding of these beautiful and mysterious lights in the polar night sky.

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