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# Alfvén waves related to moon-magnetosphere interactions

 Wednesday, 31 May 2023

 09:15 - 09:45

 Park Inn Berlin Alexanderplatz

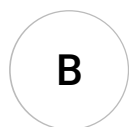
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## Abstract

The electro-dynamic interactions between moons and the magnetosphere of their parent planets has been investigated since the mid-20th century and the implication of the Alfvén waves was suspected right away. However, in the first models, Alfvén waves were only considered as current carriers. It is only after the Voyager missions that the possibility of complex reflection patterns was considered and their ability to accelerate particles become fully appreciated only recently. In this presentation, we will review the history of our understanding of the various cases of moon-magnetosphere interactions in our solar system. The presence of these massive moons in the stream of the magnetospheric plasma generates large scale Alfvén waves, which can break down to smaller scales, reflect on density gradients and accelerate particles, which could ultimately impact the atmosphere of the planet to generate auroras and trigger radio emissions. The best know case is the Io-Jupiter interaction, since its observational signatures are the most obvious. As our means of investigation improved, signatures of similar interactions have also been discovered for the other Galilean moons, as well as for moons orbiting Saturn. Interestingly, sub-Alfvénic interactions can occur on rare occasions between the planets themselves and the solar wind and most probably take place in exo-planetary systems as well.

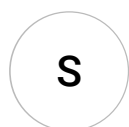
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