

# Alfvén-ion cyclotron wave interactions with ions in the solar wind

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**Abstract:** We discuss some ion kinetic mechanisms and coherent Alfvén wave phenomena in the ion-cyclotron wave frequency range relevant in the context of the solar wind. We first focus on the role of discrete particle effects in linear kinetic theory to describe spontaneous fluctuations in such plasmas. We then discuss nonlinear Alfvén-cyclotron wave propagation, wave-wave and wave-particle interactions, and the possible role of associated instabilities in shaping the ion distribution functions. Finally, we review recent results from our research group and the contribution of several other theoretical groups along these lines of research.

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