Special Issue

Properties and Impacts of Ion-Acoustic Waves

Message from the Guest Editor

Ion-acoustic waves are fundamental modes in both magnetized and unmagnetized plasmas, which have been investigated for almost a century. The goals of this special issue are twofold: 1. summarize the properties and impacts of ion acoustic waves, and 2. revisit them based on state-of-the-art modelling, observations, and applications. Ion acoustic modes and resulting turbulence impact anomalous resistivity, turbulent heating, and transport. Non-thermal or supra-thermal particles, departure from Maxwellian distributions, Cherenkov interaction, and induced scattering by ions further enrich the topic. Ion-acoustic turbulence also provides a fundamental paradigm for a plethora of more specialized applications. Although the topic has a long history, new developments benefit from improvements in computing techniques, and experimental diagnostics. They enable new approaches to remaining open questions, such as 2D and 3D dynamics, coupling with other modes, reduced or statistical modelling of coherent wave structures.

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Deadline for manuscript submissions

closed (31 March 2021)

Fluids

an Open Access Journal by MDPI

Impact Factor 1.8
CiteScore 4.0

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