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**A new branch of electrostatic fluctuations: the ion-bulk waves** FRANCESCO VALENTINI, Department of Physics, University of Calabria, FRANCESCO CALIFANO, Department of Physics, University of Pisa, DENISE PERRONE, Department of Physics, University of Calabria, FRANCESCO PEGORARO, Department of Physics, University of Pisa, PIERLUIGI VELTRI, Department of Physics, University of Calabria — We present the results of kinetic simulations that demonstrate the existence of a novel branch of nonlinear electrostatic waves (dubbed ion-bulk waves) with acoustic type dispersion, excited and sustained by the generation of a population of trapped ions. These waves have phase speed comparable to the ion thermal velocity and are analogous at low frequencies to the so-called electron acoustic waves. During the excitation process, in which an external electric field is used to create the trapped particle population, a secondary instability of the beam-plasma type occurs and brings energy to high wavenumber electric field components. The ion-bulk waves can survive against Landau damping even at low values of the electron to ion temperature ratio, at variance with the ion-acoustic waves. In the long time limit, the electric field waveforms associated with the ion-bulk waves appear as long lived soliton-like structures locked in the phase space trapping vortices. Our results are relevant for the case of the the solar-wind plasmas where the electron to ion temperature ratio is of order unity and a significant level of electrostatic activity is usually recovered from in situ measurements.

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