Geophysical Research Abstracts, Vol. 9, 05204, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05204

Role of solitary waves in producing enhanced ion-acoustic lines in incoherent radar spectra

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Since enhanced ion-acoustic lines were seen in incoherent radar spectra, there have been several suggestions of generation mechanisms. These generation mechanisms include current-driven instabilities, ion-ion two-stream instabilities and parametric decay of Langmuir waves. Based on spectra measured by the EISCAT Svalbard Radar (ESR), we investigate the possibility that the enhanced ion-acoustic lines are caused by solitary waves. The generation of these solitary waves does not require large current densities, as is the case for current-driven instabilities, and is thus in better agreement with satellite observations. This new approach is based on a recently published theory on nonlinear waves in a magnetized plasma.