



Determining the wavelength of Langmuir wave packets at the Earth's bow shock

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(Submitted on 22 Jul 2011)

The propagation of Langmuir waves in plasmas is known to be sensitive to density fluctuations. Such fluctuations may lead to the coexistence of wave pairs that have almost opposite wave-numbers in the vicinity of their reflection points. Using high frequency electric field measurements from the WIND satellite, we determine for the first time the wavelength of intense Langmuir wave packets that are generated upstream of the Earth's electron foreshock by energetic electron beams. Surprisingly, the wavelength is found to be 2 to 3 times larger than the value expected from standard theory. These values are consistent with the presence of strong inhomogeneities in the solar wind plasma rather than with the effect of weak beam instabilities.

Comments: 7 pages

Subjects: **Space Physics (physics.space-ph)**; Plasma Physics (physics.plasm-ph)

Journal reference: Annales Geophysicae 29 (2011) 613-617

DOI: [10.5194/angeo-29-613-2011](https://doi.org/10.5194/angeo-29-613-2011)

Cite as: [arXiv:1107.4439](https://arxiv.org/abs/1107.4439) [physics.space-ph]

(or [arXiv:1107.4439v1](https://arxiv.org/abs/1107.4439v1) [physics.space-ph] for this version)

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