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Particle Acceleration by electrostatic standing wave generated in the superposition of two counter propagating relativistic whistler waves

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The problem of standing wave formation by superposing two counter-propagating whistler waves in an overdense plasma, studied recently by Sano et al (2019 Phys. Rev. E 100, 053 205 and 2020 Phys. Rev. E 101, 013 206), has been revisited in the relativistic limit. A detailed theory along with simulation has been performed to study the standing wave formation in the interaction of two counter propagating relativistically intense whistler waves. The relativistic theory explains such interaction process more precisely and predicts correct field amplitudes of the standing wave for a much wider range of physical parameters of the problem as compared to its non-relativistic counterpart. The analytical results are compared with 1-D Particle-in-Cell (PIC) simulation results, performed using OSIRIS 4.0. The results are of relevance to ion acceleration to high energy and heating.

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Footnotes

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Yes

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