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CORRECTION

Correction to: Ion acoustic solitary waves in plasmas with nonextensive distributed electrons, positrons and relativistic thermal ions

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We wish to point out a mistake in the paper [Indian J Phys 90, 603 (2016)], which partially changes a few results presented.

In the above paper, σ_F $(= T_e/T_p)$ is defined as the electron-to-positron temperature ratio. The values of σ_F as found in the astrophysical and laboratory laser-generated plasmas usually $\sigma_F \geq 1$. Unfortunately, some of our results in this paper will provide misleading information to the readers due to incorrectly defined σ_F $(= 0.01 - 0.05)$.

Under this condition, errors in the above paper should be corrected as follows:

1. Figure 1(b), (c) and (d) on page 606 should be replaced by the corrected Fig. 1(b), (c) and (d).
2. Figure 2(a) and (b) on page 607 should be replaced by the corrected Fig. 2(a) and (b).
3. Figure 3(a) and (b) on page 607 should be replaced by the corrected Fig. 3(a) and (b).
4. Figure 4(a), (b) (c) and (d) on page 608 should be replaced by the corrected Fig. 4(a), (b) (c) and (d).
5. Figure 5(a) and (b) on page 609 should be replaced by the corrected Fig. 5(a) and (b).
6. Figure 6 on page 610 should be replaced by the corrected Fig. 6.

The effects on phase velocity $(v_0 - u_{i0})$ with the relativistic streaming factor β at different values of p, σ_F and δ keeping the remaining physical parameters constant are studied and displayed in Fig. 1(b)–1(d), respectively. Figure 1(b)–1(d) show that the phase velocity decrease with increasing p and σ_F, but increases with increasing δ. This happens due to the increase of inertia of the ion acoustic solitary waves (IASWs), where the inertia comes from the mass of the ions, and the restoring force comes from the pressure of both nonextensive electrons and positrons, with the increase of ion temperature and positron concentration. The changes of amplitude and width of the solitons with β for different values of p and δ corresponding to the fixed values of the other plasma parameters are presented in Figs. 2(a), 2(b), 3(a) and 3(b), respectively. Figures 2(a), 2(b), 3(a) and 3(b) show that the amplitude of the solitons decreases with increasing p and δ, but increases with increasing β. Besides, the width of the solitons decreases with increasing p, δ and β. Figure 4(a)–4(d) displays the weakly relativistic effects on electrostatic ion acoustic solitary waves (IASWs) for different values of p (taking $\sigma_F = 1$, $\beta = 0.1$, $q = 0.6$, $\delta = 0.01$ and $V = 0.0075$), δ (taking $\sigma_F = 1$, $\beta = 0.1$, $q = 0.6$, $p = 0.5$ and $V = 0.0075$), σ_F (taking $p = 0.5$, $\beta = 0.1$, $q = 0.6$, $\delta = 0.01$ and $V = 0.0075$), and β (taking $\sigma_F = 1$, $p = 0.5$, $q = 0.6$, $\delta = 0.01$ and $V = 0.0075$), respectively. It is seen that the electrostatic potentials have a remarkable effects on the solitary waves and the pattern of the solitary waves become bell type, indicating the positive bright solitons. It is also observed from Fig. 4(a)–4(d) that the peak amplitudes of solitary waves decreases with increasing p, δ and σ_F, but increases with the increase of β. Finally, the electrostatic effects on weakly relativistic IASWs for different values of q with the fixed values of the remaining plasma parameters are depicted in Figs. 5(a), 5(b) and 6, respectively. Figure 5(a) and 5(b) reveals that the peak amplitudes as well as widths of the solitons decrease as the values of q increase and dictated that the structures of the

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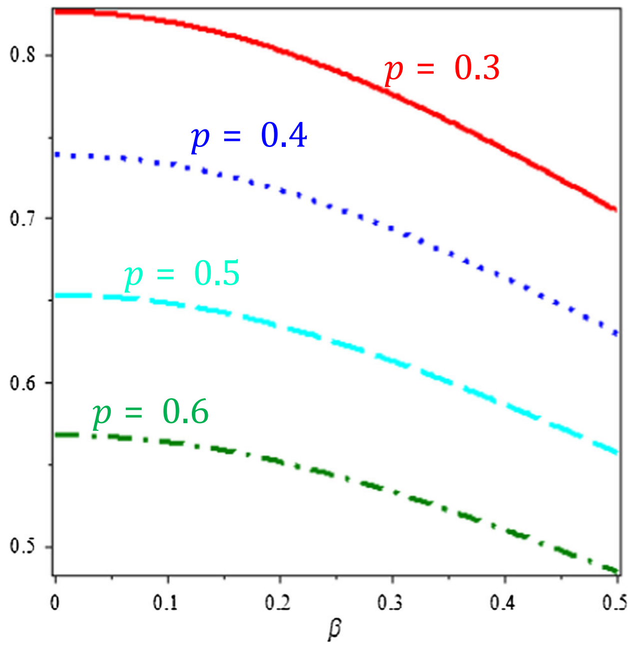
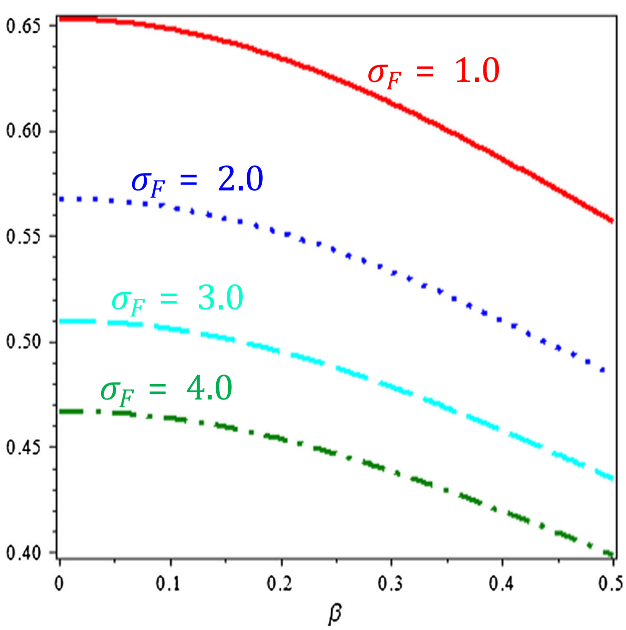
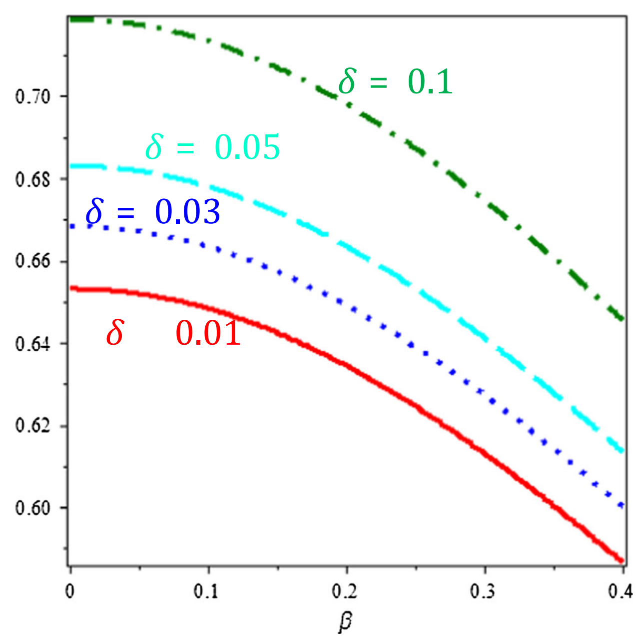


(b)



(c)



(d)

Fig. 1 Dependence of phase velocity ($U_F = v_0 - u_{i0}$) on relativistic streaming factor β for different values of (**b**) $p = 0.3$, $p = 0.4$, $p = 0.5$, $p = 0.6$ for $\sigma_F = 1$, $\delta = 0.01$ and $q = 0.6$; (**c**) $\sigma_F = 1.0$, $\sigma_F = 2.0$, $\sigma_F = 3.0$, $\sigma_F = 4.0$ for $p = 0.5$, $\delta = 0.01$ and $q = 0.6$; (**d**) $\delta = 0.01$, $\delta = 0.03$, $\delta = 0.05$, $\delta = 0.1$ for $\sigma_F = 1$, $p = 0.5$, and $q = 0.6$

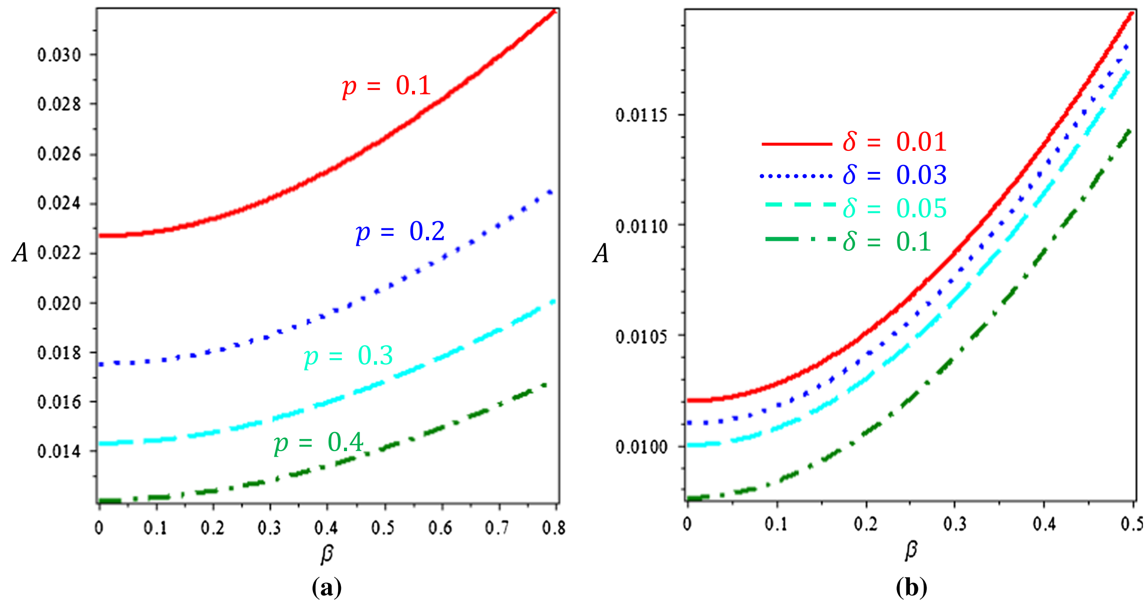


Fig. 2 Dependence of amplitude of the soliton on relativistic streaming factor β for (**a**) $p = 0.1$, $p = 0.2$, $p = 0.3$, $p = 0.4$ taking $\sigma_F = 1$, $\delta = 0.01$, $V = 0.0075$ and $q = 0.6$, and (**b**) $\delta = 0.01$, $\delta = 0.03$, $\delta = 0.05$, $\delta = 0.1$ taking $\sigma_F = 1$, $V = 0.0075$, $p = 0.5$ and $q = 0.6$

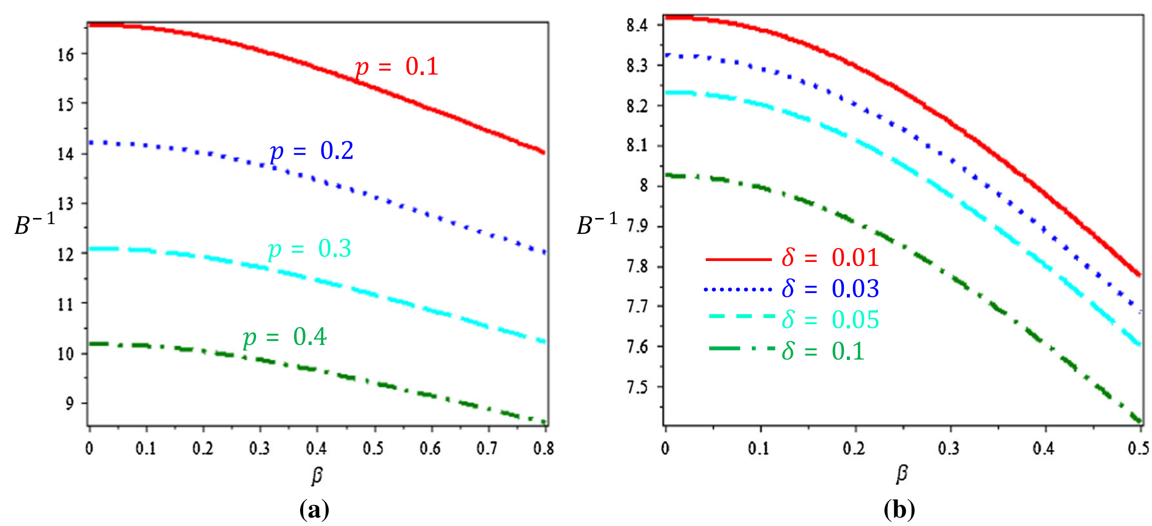


Fig. 3 Variation of width of the soliton with β for (**a**) $p = 0.1$, $p = 0.2$, $p = 0.3$, $p = 0.4$ for constant values of taking $\sigma_F = 1$, $\delta = 0.01$, $V = 0.0075$ and $q = 0.6$ and (**b**) $\delta = 0.01$, $\delta = 0.03$, $\delta = 0.05$, $\delta = 0.1$ taking $\sigma_F = 1$, $V = 0.0075$, $p = 0.5$ and $q = 0.6$

solitary waves become bell type for $0 < q < 1$, while the widths of the solitary waves are reduced for $q > 1$. Figure 6 shows the variation of IASWs that propagates in negative region for different values of q with the fixed values of $\sigma_F = 1$, $\beta = 0.1$, $V = 0.0075$, $\delta = 0.1$ and $p = 0.1$. It is seen that both types of positive and negative solitons appear in the case of superthermality, while only positive bright solitons appear in the case of subthermality. Furthermore, Fig. 6 provides that the negative bright soliton appears for only negative values of q $(0 > q > -1)$ for the small values of δ and p for which the nonlinear coefficient χ_1 of the KdV equation is negative, otherwise positive bright solitons are appeared. It is observed that the electrostatic interactions between electrons and positrons increase, and thus their contributions to the restoring force increases with the increase of positrons concentration. As a result, the amplitude of IASWs decreases significantly. On the other hand, the IASWs propagate faster with the

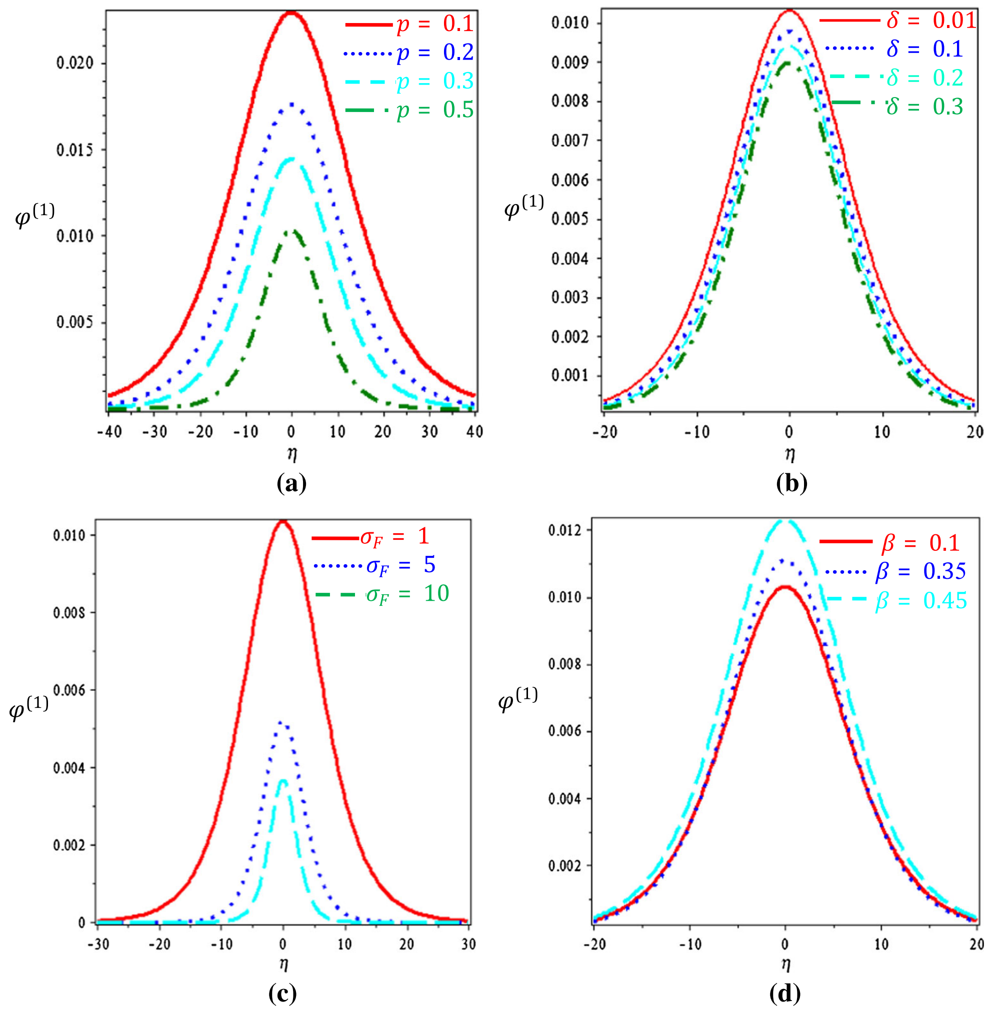


Fig. 4 Weakly relativistic effect on electrostatic IASWs for (**a**) $p = 0.1$, $p = 0.2$, $p = 0.3$, $p = 0.5$ taking $\sigma_F = 1$, $\beta = 0.1$, $q = 0.6$ and $\delta = 0.01$, (**b**) $\delta = 0.01$, $\delta = 0.1$, $\delta = 0.2$, $\delta = 0.3$ taking $\sigma_F = 1$, $\beta = 0.1$, $q = 0.6$ and $p = 0.5$, (**c**) $\sigma_F = 1$, $\sigma_F = 5$, $\sigma_F = 10$ taking $p = 0.5$, $\beta = 0.1$, $q = 0.6$ and $\delta = 0.01$, and (**d**) $\beta = 0.1$, $\beta = 0.35$ and $\beta = 0.45$ taking $\sigma_F = 1$, $p = 0.5$, $q = 0.6$ and $\delta = 0.01$. The other parameter considered as $V = 0.0075$

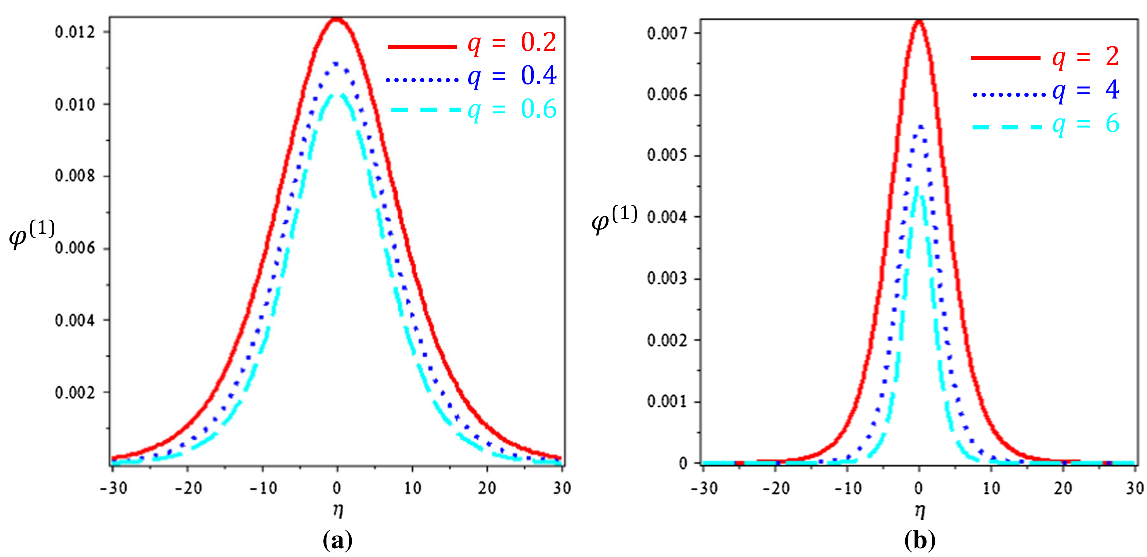


Fig. 5 Weakly relativistic effect on electrostatic IASWs for different values of (**a**) $q = 0.2$, $q = 0.4$ and $q = 0.6$ and (**b**) $q = 2$, $q = 4$ and $q = 6$ for $\sigma_F = 1$, $\beta = 0.1$, $V = 0.0075$, $\delta = 0.01$ and $p = 0.5$

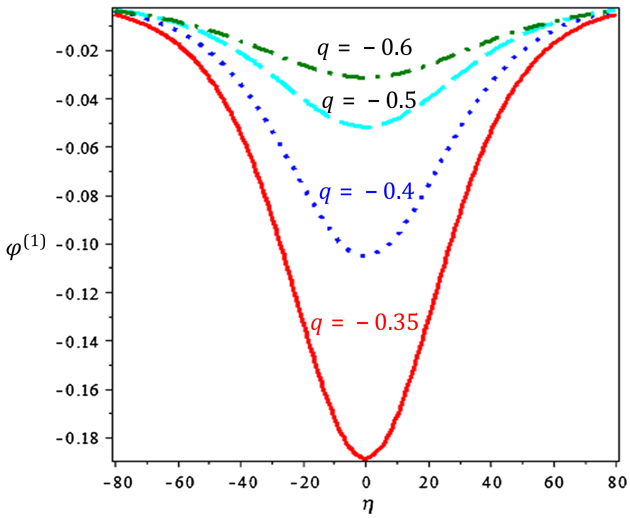


Fig. 6 Weakly relativistic effect on electrostatic IASWs for different values of $q = -0.3$, $q = -0.4$, $q = -0.5$ and $q = -0.6$ taking $\sigma_F = 1$, $\beta = 0.1$, $p = 0.1$ and $\delta = 0.1$ and $V = 0.0075$

increase of relativistic streaming factor of ions. Thus, the effects of nonextensive electrons and positrons on relativistic thermal ions, predicted in this investigation, would be helpful in understanding the effects of nonextensivity in interstellar, astrophysical and space plasmas, particularly in plasma sheet boundary layer of earth's magnetosphere, quark-gluon plasma, etc. as well as in laser-generated laboratory plasmas.