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Erratum

Charged relativistic fluids and non-linear electrodynamics

T. Dereli[1(a)] and R. W. Tucker[2,3(b)]

[1] *Department of Physics, Koç University - 34450 Istanbul, Turkey*
[2] *The Cockcroft Institute - Daresbury, UK, EU*
[3] *Department of Physics, Lancaster University - Lancaster, UK, EU*

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In our paper, the behaviour of a relativistic fluid was discussed in the context of theories in which the electromagnetic field was governed by a class of non-linear electrodynamic field equations in the vacuum. The equation of motion of the fluid was derived from the vanishing of the divergence of the total stress-energy-momentum tensor for the fluid. An unnoticed simplification of the electromagnetic contribution to this tensor results in a further simplification to our final result. In the notation the above paper this simplification arises from the identity

$$\Pi_V(i_\eta F - \xi) = 0$$

leading to the final equation for the motion for a Born-Infeld fluid:

$$(\rho + p)\widetilde{\nabla_V V} = \rho_e\, i_V\, F - \Pi_V d\, p. \tag{1}$$

Thus, there is no additional electrodynamic force $\Pi_V(i_\eta F - \xi)$ on a neutral $U(1)$ Born-Infeld fluid in the vacuum as we surmised. This in no way changes our conclusion about the exact solution for a plane Born-Infeld wave in a static magnetic field that might be used experimentally to bound the fundamental coupling that enters into the Born-Infeld field system.

* * *

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(a) E-mail: tdereli@ku.edu.tr
(b) E-mail: r.tucker@lancaster.ac.uk