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Erratum

Erratum to "Statistical theory of magnetohydrodynamic turbulence: Recent results" [Phys. Rep. 401 (2004) 229–381]

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Page 245: The correct forms of Eq. (23) is

$$\left(\frac{\partial}{\partial t} + \nu k^2\right) u_i(\mathbf{k}, t) - \mathrm{i}(\mathbf{B}_0 \cdot \mathbf{k}) b_i(\mathbf{k}, t)$$
$$= -\mathrm{i}k_i p_{\mathrm{tot}}(\mathbf{k}, t) - \mathrm{i}k_j \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} u_j(\mathbf{k}-\mathbf{p}, t) u_i(\mathbf{p}, t) + \mathrm{i}k_j \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} b_j(k-\mathbf{p}, t) b_i(\mathbf{p}, t), \quad (23)$$

Page 246: The correct forms of Eqs. (24)–(26) are

$$\left(\frac{\partial}{\partial t} + \eta k^2\right) b_i(\mathbf{k}, t) - \mathrm{i}(\mathbf{B}_0 \cdot \mathbf{k}) u_i(\mathbf{k}, t)$$
$$= -\mathrm{i}k_j \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} u_j(\mathbf{k}-\mathbf{p}, t) b_i(\mathbf{p}, t) + \mathrm{i}k_j \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} b_j(\mathbf{k}-\mathbf{p}, t) u_i(\mathbf{p}, t), \quad (24)$$

$$\left(\frac{\partial}{\partial t} + \nu k^2\right) u_i(\mathbf{k}, t) - \mathrm{i}(\mathbf{B}_0 \cdot \mathbf{k}) b_i(\mathbf{k}, t)$$
$$= -\frac{\mathrm{i}}{2} P^{+}_{ijm}(\mathbf{k}) \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} [u_j(\mathbf{p}, t) u_m(\mathbf{k}-\mathbf{p}, t) - b_j(\mathbf{p}, t) b_m(\mathbf{k}-\mathbf{p}, t)], \quad (25)$$

$$\left(\frac{\partial}{\partial t} + \eta k^2\right) b_i(\mathbf{k}, t) - \mathrm{i}(\mathbf{B}_0 \cdot \mathbf{k}) u_i(\mathbf{k}, t) = -\mathrm{i}P^{-}_{ijm}(\mathbf{k}) \int \frac{\mathrm{d}\mathbf{p}}{(2\pi)^d} [u_j(\mathbf{p}, t) b_m(\mathbf{k}-\mathbf{p}, t)], \quad (26)$$

Page 249: The first equation on this page is to be corrected as

$$\langle u_i(\mathbf{k}, t) u_j(\mathbf{k}', t)\rangle = \left[P_{ij}(\mathbf{k}) C^{uu}(\mathbf{k}) - \mathrm{i}\varepsilon_{ijl} k_l \frac{H_K(\mathbf{k})}{k^2}\right] (2\pi)^d \delta(\mathbf{k}+\mathbf{k}').$$

Page 251: Eq. (39) is to be corrected as

$$R^{uu}(\mathbf{p}|\mathbf{k}'|\mathbf{q}) + R^{uu}(\mathbf{p}|\mathbf{q}|\mathbf{k}') = S^{uu}(\mathbf{p}|\mathbf{k}', \mathbf{q}). \quad (39)$$

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Page 252: Eq. (44) is to be corrected as

$$S^{uu}(\mathbf{k}'|\mathbf{p}|\mathbf{q}) = -\Im([\mathbf{k}' \cdot \mathbf{u}(\mathbf{q})][\mathbf{u}(\mathbf{k}') \cdot \mathbf{u}(\mathbf{p})]). \tag{44}$$

Page 259: The equation of Item 6 should be read as

$$\begin{aligned} &S^{H_M}(\mathbf{k}'|\mathbf{p}|\mathbf{q}) + S^{H_M}(\mathbf{k}'|\mathbf{q}|\mathbf{p}) + S^{H_M}(\mathbf{p}|\mathbf{k}'|\mathbf{q}) \\ &\quad + S^{H_M}(\mathbf{p}|\mathbf{k}'|\mathbf{q}) + S^{H_M}(\mathbf{q}|\mathbf{k}'|\mathbf{p}) + S^{H_M}(\mathbf{q}|\mathbf{p}|\mathbf{k}') = 0. \end{aligned}$$

Page 260. The statement in Item 9 is incorrect and should be replaced with: the discussion in Section 3 is valid for zero mean magnetic field. In the presence of a mean magnetic field, Eqs. (58) and (59) become

$$\begin{aligned} \frac{\partial E^u(\mathbf{k})}{\partial t} + 2\nu k^2 E^u(\mathbf{k}) = &\sum_{\mathbf{k}'+\mathbf{p}+\mathbf{q}=0} \frac{1}{2} S^{uu}(\mathbf{k}'|\mathbf{p},\mathbf{q}) + \sum_{\mathbf{k}'+\mathbf{p}+\mathbf{q}=0} \frac{1}{2} S^{ub}(\mathbf{k}'|\mathbf{p},\mathbf{q}) \\ &- (\mathbf{B}_0 \cdot \mathbf{k})\Im(u_i^*(\mathbf{k}) b_i(\mathbf{k})), \end{aligned}$$

$$\begin{aligned} \frac{\partial E^b(\mathbf{k})}{\partial t} + 2\mu k^2 E^b(\mathbf{k}) = &\sum_{\mathbf{k}'+\mathbf{p}+\mathbf{q}=0} \frac{1}{2} S^{bb}(\mathbf{k}'|\mathbf{p},\mathbf{q}) + \sum_{\mathbf{k}'+\mathbf{p}+\mathbf{q}=0} \frac{1}{2} S^{bu}(\mathbf{k}'|\mathbf{p},\mathbf{q}) \\ &- (\mathbf{B}_0 \cdot \mathbf{k})\Im(b_i^*(\mathbf{k}) u_i(\mathbf{k})). \end{aligned}$$

Hence, the rate of change of kinetic energy due to mean magnetic field is $-(\mathbf{B}_0 \cdot \mathbf{k})\Im(u_i * (\mathbf{k}) b_i(\mathbf{k}))$. Since $\Im(u_i^*(\mathbf{k}) b_i(\mathbf{k})) = -\Im(b_i^*(\mathbf{k}) u_i(\mathbf{k}))$, the energy gained by the velocity field is the energy lost by magnetic field. Hence the mean magnetic field induces energy transfer from $\mathbf{u}(\mathbf{k})$ to $\mathbf{b}(\mathbf{k})$. Note that the Cross helicity is $\Re(u_i^*(\mathbf{k}) b_i(\mathbf{k}))$.

Page 278: The first equation in Section 6.1 is to be corrected as

$$\begin{aligned} \frac{\partial \mathbf{z}^{\pm}(\mathbf{k},t)}{\partial t} = &\pm \mathrm{i}(\mathbf{B}_0 \cdot \mathbf{k})\mathbf{z}^{\pm}(\mathbf{k},t) - \mathrm{i}\mathbf{k} p(\mathbf{k},t) - FT[\mathbf{z}^{\mp}(\mathbf{x},t) \cdot \nabla \mathbf{z}^{\pm}(\mathbf{x},\mathbf{t})] \\ &- \nu_{\pm} k^2 \mathbf{z}^{\pm}(\mathbf{k},t) - \nu_{\mp} k^2 \mathbf{z}^{\mp}(\mathbf{k},t) + \mathbf{f}^{\pm}(\mathbf{k},t). \end{aligned}$$

Page 279: The equation in Item 4 is to be corrected as

$$p(\mathbf{k},t) = \frac{\mathrm{i}\mathbf{k}}{k^2} \cdot FT[\mathbf{z}^{\mp}(\mathbf{x},t) \cdot \nabla \mathbf{z}^{\pm}(\mathbf{x},\mathbf{t})].$$

Page 294: In the integral of Eq. (124) integration is over the variable $\hat{p}$, not $\hat{k}$. The correct form of Eq. (126) is

$$\langle z_s^{a<}(\hat{p}) z_m^{b<}(\hat{q}) \rangle = P_{sm}(\mathbf{p}) C^{ab}(\hat{p}) \delta(\hat{p} + \hat{q})(2\pi)^{d+1}. \tag{126}$$

Page 295: In the first equation of this page integration is over the variable $\hat{p}$, not $\hat{k}$.

Page 314: In the last line of Eq. (204), $G^{uu}(q, t-t')$ is to be replaced by $G^{bb}(q, t-t')$.

Page 318: In Table 8 the column entries for 0.6 (th) are to be changed to 0.53, 0.35, 0.27, 0.32, –, –, 1.56, 0.59, 1.63, 0.566. For 0.4 (th), $K^+ = 1.84$ and $K^u = 0.53$.

Page 321: The equations after Eq. (230) are to be corrected as

$$\langle u_i(\mathbf{p},t) u_j(\mathbf{q},t') \rangle = \left[P_{ij}(\mathbf{p}) C^{uu}(\mathbf{p},t,t') - \mathrm{i}\varepsilon_{ijl} k_l \frac{H_K(k,t,t')}{k^2} \right] \delta(\mathbf{p}+\mathbf{q})(2\pi)^3,$$

$$\langle b_i(\mathbf{p},t) b_j(\mathbf{q},t') \rangle = [P_{ij}(\mathbf{p}) C^{bb}(\mathbf{p},t,t') - \mathrm{i}\varepsilon_{ijl} k_l H_M(k,t,t')] \delta(\mathbf{p}+\mathbf{q})(2\pi)^3.$$

Page 325: Eq. (243) is to be replaced by

$$\frac{\Pi_{H_M}(k_0)}{\Pi} = \frac{1}{k_0}(-d r_M + e r_K). \tag{243}$$

Page 363: The dotted-arrow in the second term in Eq. (B.9) should be replaced by dotted line.