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CORRIGENDUM

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Corrigendum: An educational path for the magnetic vector potential and its physical implications

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S Barbieri[1], **M Cavinato**[2] **and M Giliberti**[2]

[1] Dipartimento di Fisica e Techologie Relative, Università degli Studi di Palermo, Palermo, Italy
[2] Dipartimento di Fisica, Università degli Studi di Milano, Milano, Italy

E-mail: marco.giliberti@unimi.it

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Equation (3) of Barbieri *et al* (2013 *Eur. J. Phys.* **34** 1209) is incorrect since it has been written in terms of the retarded time t' instead of the present time t.

Therefore, in place of the following:

$$‘\mathbf{B}\left(\mathbf{r},t\right)=\frac{\mu_0}{4\pi}\int_{V'}\frac{\left[\mathbf{J}\left(\mathbf{r}',t'\right)+\varepsilon_0\frac{\partial\mathbf{E}(\mathbf{r}',t')}{\partial t}\right]\times\Delta\mathbf{r}}{(\Delta r)^3}\,\mathrm{d}V', \tag{3}$$

where V' is the region containing the currents and

$$\Delta\mathbf{r}\equiv\mathbf{r}-\mathbf{r}',\quad \Delta r\equiv|\Delta\mathbf{r}|,\quad t'\equiv t-\frac{\Delta r}{c}, \tag{4}$$

where t' is the retarded time. If we now adopt the quasi-static approximation, that is if we consider only fields that are slowly varying in time, we can neglect all the time derivative multiplied by $1/c$ (but not time-dependent terms alone). Therefore the contribution of the displacement currents in equation (3) can be disregarded, thanks to the presence of the constant $\varepsilon_0\mu_0=1/c^2$ that multiplies the time derivative of $\mathbf{E}$. Moreover, the retarded time t' of equation (4) also can be considered equal to t.’,

please read:

$$‘\mathbf{B}\left(\mathbf{r},t\right)=\frac{\mu_0}{4\pi}\int_{V'}\frac{\left[\mathbf{J}\left(\mathbf{r}',t\right)+\varepsilon_0\frac{\partial\mathbf{E}(\mathbf{r}',t)}{\partial t}\right]\times\Delta\mathbf{r}}{(\Delta r)^3}\,\mathrm{d}V', \tag{3}$$

where V' is the region containing the currents and

$$\Delta\mathbf{r}\equiv\mathbf{r}-\mathbf{r}',\quad \Delta r\equiv|\Delta\mathbf{r}|. \tag{4}$$

If we now adopt the quasi-static approximation, that is if we consider only fields that are slowly varying in time, we can neglect all the time derivatives multiplied by $\varepsilon_0\mu_0 = 1/c^2$ (but not time-dependent terms alone). The contribution of the displacement currents in equation (3) can, therefore, be disregarded.'

The mistake in equation (3) of Barbieri *et al* (2013 *Eur. J. Phys.* **34** 1209) does not influence any of the results or conclusions of the original paper.