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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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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:

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

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:

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

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.