Erratum: Micromagnetism and magnetization reversal of embedded ferromagnetic elements [Phys. Rev. B 74, 184405 (2006)]

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The result calculated numerically from Eq. (9) is apparently wrong. We do not repeat the calculation here as discussions with R. Neb have shown that it is both more reasonable and more advantageous to consider the observed twin wall structure as a series of four 90° domain walls and use an expression of the form

$$w_{\mathrm{int}} = \int_{-\infty}^{\infty} \sin(2\varphi)dx = \int_{-\infty}^{\infty} 2\sin(\varphi)\cos(\varphi)dx$$

to calculate an integral wall width of each 90° wall segment. This new method has the advantage that it (a) facilitates the comparison with the numerical OOMMF simulation shown in Fig. 8 where a 90° domain wall is also analyzed and (b) allows for a numerical calculation of the width of the *whole* twin wall structure as we show in the following.

Concerning wall segment I of Fig. 7, Eq. (8) is still valid and can be multiplied with 2 cos (φ),

$$2\sin(\varphi)\cos(\varphi)dx = \sqrt{\frac{4A\cos^2(\varphi) + 4(A+S)\cos^4(\varphi)}{-2\frac{J_1}{D} + \left(4\frac{J_2}{D} + K_{c,1}\right)\cos^2(\varphi)}},$$

yielding a wall width of

$$w_{\mathrm{int}} = \int_{-\infty}^{\infty} 2\sin(\varphi)\cos(\varphi)dx = \int_{0}^{\pi/2} \sqrt{\frac{4A\cos^2(\varphi) + 4(A+S)\cos^4(\varphi)}{-2\frac{J_1}{D} + \left(4\frac{J_2}{D} + K_{c,1}\right)\cos^2(\varphi)}}d\varphi \approx 29 \text{ nm}$$

for this wall segment, according to the new definition of w_{int}.

In segment II of Fig. 7, which can be considered as consisting of three 90° walls, the contribution of the interlayer exchange coupling to the total energy density is independent of φ and, therefore, is constant, hence, it vanishes in a variational derivative. As a result, an integral wall width (e.g., for the central 90° wall) of the form

$$w_{\mathrm{int}} = \int_{0}^{\pi/2} \sqrt{\frac{4A\cos^2(\varphi) + 4(A+S)\cos^4(\varphi)}{K_{c,1}\cos^2(\varphi)}}d\varphi \approx 2\sqrt{\frac{A}{K_{c,1}}} \int_{0}^{\pi/2} \sqrt{1 + \left(1 + \frac{S}{A}\right)\cos^2(\varphi)}d\varphi$$

is obtained, which is a complete elliptic integral of the second kind. Inserting values of $A = 2.1 \times 10^{-11}$ J/m, $K_{c,1} = 4.5 \times 10^4$ J/m^3, and $S = 7.12 \times 10^{-12}$ J/m results in a wall width of ≈87 nm for such a segment. Hence, a total width of

$$w_{\mathrm{tot}} \approx 29 + 3 \times 87 \text{ nm} = 290 \text{ nm}$$

is obtained. It should be noted that this result is actually a lower limit for the total wall width as it is assumed that all four wall segments are lying directly adjacent to each other, which need not necessarily be the case in a material with fourfold anisotropy [see, e.g., the discussion about Fig. 11(a) in the paper]. The result obtained by Eq. (5) of this Erratum still essentially confirms experimental observations as described previously.

We would also like to mention that the value of the saturation magnetization of iron ($M_S = 1800$ G) is given as $M_S = 1800$ emu/cm^3 in a large part of the literature. In any way, it has to be inserted in Gaussian units into

$$S = \pi b D M_S^2$$

to calculate the stray field parameter S.

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