Corrections for "Solution of the Skyrme–HF+BCS equation on a 3D mesh, II: A new version of the Ev8 code"

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This document is an unfortunately growing set of corrections for the **original** published version of the paper on the Ev8 code, Ref. [1]. Please note that this does not concern any errors in the source code; when found, these errors will be corrected (and documented) in history of this git repository.

1. There is a missing factor of 1/2 in the expression for the direct Coulomb energy, Eq. (43). The correct formula is

$$E_{\mathrm{Coul}}^{\mathrm{d}} = \frac{1}{2} \int d^3 r \, U(\mathbf{r}) \rho_p(\mathbf{r}) \,. \tag{1}$$

2. The equations for the pairing cutoff, Eqs. (51) and (52), are affected by a misprint: neither should have a square root. Additionally, the exponent in the second factor of Eq. (52) has the wrong overall sign. Equations (51) and (52) should read respectively

$$f_k = [1 + e^{(+\epsilon_k - \lambda_q - \Delta\epsilon_q)/\mu_q}]^{-1} \,, \tag{2}$$

$$f_k = [1 + e^{(+\epsilon_k - \lambda_q - \Delta\epsilon_q)/\mu_q}]^{-1} [1 + e^{(-\epsilon_k + \lambda_q - \Delta\epsilon_q)/\mu_q}]^{-1} \,. \tag{3}$$

3. There is a missing factor of 2 in Eq.(68) of the original paper in front of $\hat{Q}_{22}^2$. Corrected, it should read

$$q = \sqrt{\frac{16\pi}{5} \left\langle \hat{Q}_{20}^2 + 2\hat{Q}_{22}^2 \right\rangle} = \sqrt{\frac{2}{3} \left\langle \hat{Q}_x^2 + \hat{Q}_y^2 + \hat{Q}_z^2 \right\rangle} \,. \tag{4}$$

4. Eq. (96) in the original paper contains several errors. Two of these were already corrected in the corrigendum [2]: a global sign and a factor $\frac{\pi^2}{3}$ given in the second line that should not be squared. A third error was not corrected: the equation for the second derivative in Ref. [2] still contains a superfluous factor of two for $i \neq j$. The correct version of Eq. (96) reads:

$$\left. \frac{d^2 f_t(x)}{dx^2} \right|_{x=x_s} = \begin{cases} (-1)^{t-s+1} 2 \left(\frac{\pi}{Ndx}\right)^2 \frac{\cos[\pi(t-s)/N]}{\sin^2[\pi(t-s)/N]} & \text{for } t \neq s \,, \\ -\frac{\pi^2}{3dx^2} \left(1 - \frac{1}{N^2}\right) & \text{for } t = s \,. \end{cases} \tag{5}$$

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[1] W. Ryssens, V. Hellemans, M. Bender and P.-H. Heenen, *Solution of the Skyrme-HF+BCS equation on a 3D mesh, II: A new version of the Ev8 code*, Computer Physics Communications **187**, 175-194 (2015). DOI:10.1016/j.cpc.2014.10.001.

[2] W. Ryssens, V. Hellemans, M. Bender and P.-H. Heenen, *Corrigendum to "Solution of the Skyrme-HF+BCS equation on a 3D mesh, II: A new version of the Ev8 code"*, Computer Physics Communications **190**, 231 (2015). DOI:10.1016/j.cpc.2015.01.011.

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