Erratum

The Magnetisation of Large Atoms in Strong Magnetic Fields

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The proof of [Fou01] contains an unjustified inequality. In Sect. 5, to get Eq. (15), it is tacitly used that

$$\tilde{D}_t(\rho_{t,\lambda,\beta} - \rho_\psi, \rho_{t,\lambda,\beta} - \rho_\psi) \geq 0.$$

This is based on the idea that $\tilde{D}_t$ is positively definite, i.e. that

$$\tilde{D}_t(f, f) \geq 0, \text{ for all } f \in \mathcal{D}(\tilde{D}_t). \quad (0.1)$$

Though (0.1) is correct for positive f , it is not at all clear that it holds for functions with variable sign.

The remedy to this is to replace $\tilde{D}_t$ by another quadratic form, having the same Taylor expansion in t to first order, and being clearly positive. This is accomplished by redefining $\tilde{D}_t$ as

$$\tilde{D}_t(f, g) = \frac{1}{2} \iint_{\mathbb{R}^3 \times \mathbb{R}^3} \frac{\overline{f(x)}g(y)}{|\phi_t(x) - \phi_t(y)|} dx dy,$$

with ϕ_t being the function introduced in [Fou01, Appendix A]: $\phi_t(x + t\tilde{\mathbf{a}}(x)) = x$. By a change of variables, and the positivity of the Coulomb kernel, this new $\tilde{D}_t$ is positively definite. Further details are given in [Fou03].

References

- [Fou01] Fournais, S.: The magnetisation of large atoms in strong magnetic fields. Commun. Math. Phys. **216**(2), 375–393 (2001)
- [Fou03] Fournais, S.: Confinement to lowest Landau band and application to quantum current. Rev. Math. Phys. **15**(10), 1219–1254 (2003)