Surface critical behaviour at m-axial Lifshitz points: continuum models, boundary conditions and two-loop renormalization group results

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Corrigendum

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Equation (12) contains a sign error; it should read

$$\omega_\lambda \equiv (\partial_\lambda \beta_\lambda)(u^*, \lambda^*) = P_\lambda^{(1,-1;1)}\, u^* + \mathrm{O}(\epsilon^2) = -\frac{n+2}{n+8}\,\epsilon + \mathrm{O}(\epsilon^2)\ . \qquad (12)$$

Since the slope $(\partial_\lambda \beta_\lambda)(u^*, \lambda^*)$ is negative, the fixed points at $u = u^*$ and $\lambda = \lambda^* = O(\epsilon)$ are unstable in the λ direction, and λ^* becomes negative at order ϵ. This implies that the fixed points $\mathcal{P}^*_{\mathrm{ord}}$, $\mathcal{P}^*_{\mathrm{sp}}$, and $\mathcal{P}^*_{\mathrm{ex}}$ describing the ordinary, special and extraordinary transitions, respectively, cannot be located at $\lambda^* = O(\epsilon)$. However, there also exists a nontrivial zero $\lambda^*_+ = \lambda_0(m) + O(\epsilon)$ of $\beta_\lambda(u^*, \lambda)$ with $\lambda_0(m) > 0$ that has a positive slope $(\partial_\lambda \beta_\lambda)(u^*, \lambda^*_+)$. The fixed points $\mathcal{P}^*_{\mathrm{ord}}$, $\mathcal{P}^*_{\mathrm{sp}}$, and $\mathcal{P}^*_{\mathrm{ex}}$ are located at this value of λ. The schematic picture of the renormalization group flow near these fixed points remains correct; only their location changes from $\lambda^* = O(\epsilon)$ to $\lambda^*_+ = O(1)$.

Since our way of determining the critical exponents of the ordinary transition made no use of the value of λ^*_+, the $O(\epsilon^2)$ results we obtained for them remain valid. On the other hand, our speculation that the surface critical exponents of the special transition, to first order in ϵ, should be independent of m is no longer justified. Details of our analysis of the ordinary transition can be found elsewhere [1].

References

[1] H W Diehl, A Gerwinski and S Rutkevich 2003 cond-mat/0308483 (submitted to *Phys. Rev.* B)

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