

Erratum: Statistical mechanics of indistinguishable energy states and the glass transition
[Phys. Rev. E **114, 014119 (2026)]**

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(Received 17 September 2026; published 13 October 2026)

DOI: [10.1103/56qv-z739](https://doi.org/10.1103/56qv-z739)

Equation (27) is an incorrect expression for κ , and it is dimensionally inconsistent. The correct entropy scales as the square root of the occupation number $n(\epsilon) = \frac{\pi^2 k_B^2 T^2}{6(\epsilon - \mu)^2}$:

$$S = \int k_B \pi \sqrt{\frac{2n(\epsilon)}{3}} \rho(\epsilon) d\epsilon \quad (1)$$

$$= \frac{\pi^2 k_B^2 T}{3} \int \frac{\rho(\epsilon)}{\epsilon - \mu} d\epsilon. \quad (2)$$

The next step is to eliminate the temperature T from S in terms of the total particle number N ,

$$T = \frac{1}{\pi k_B} \sqrt{\frac{6N}{\int \frac{\rho(\epsilon)}{(\epsilon - \mu)^2} d\epsilon}}. \quad (3)$$

Simplifying the constants yields the final expression for the entropy,

$$\frac{S}{k_B} = 2\pi \sqrt{\frac{N}{6}} \frac{\int \frac{\rho(\epsilon)}{\epsilon - \mu} d\epsilon}{\sqrt{\int \frac{\rho(\epsilon)}{(\epsilon - \mu)^2} d\epsilon}} \quad (4)$$

$$= 2\pi \sqrt{\frac{\kappa N}{6}}, \quad (5)$$

where the correct, dimensionally consistent expression for Eq. (27) is

$$\kappa = \frac{\left(\int \frac{\rho(\epsilon)}{\epsilon - \mu} d\epsilon \right)^2}{\int \frac{\rho(\epsilon)}{(\epsilon - \mu)^2} d\epsilon}. \quad (6)$$

This mathematically confirms the primary result of Eq. (26), where the subextensive $S \propto \sqrt{N}$ scaling emerges directly from the distribution mechanics. Since κ is a nonuniversal constant, no conclusions of the paper should be affected.