

Fractional Charge

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Abstract: A key lesson of quantum mechanics is that dynamical quantities, which in classical physics take arbitrary values, become quantized within quantum mechanics, for example energy, angular momentum, etc. Here I shall describe a quantum effect that goes in the opposite direction:

classical quantities that possess integrality, like particle number, can become fractional due to quantum effects. This phenomenon is playing a central role in contemporary condensed matter physics, and relies on unanticipated mathematical structures in the spectrum of the relevant quantum operators.