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Complete Sets of Solutions in Quantum Mechanics and their Connection with Gravity RAFAEL SIERRA, Southern Methodist University — In typical non-relativistic quantum mechanical theory, solutions which are not normalizable are thrown away on the basis of being non-physical. The author does not contend that these solutions exist or are physically reasonable, but, these solutions do introduce interesting physics that can serve to connect the force of gravity with the laws of thermodynamics in a shockingly intimate way. The author will discuss the necessary extensions to the formalism of Schrodinger in order to better deal with and make sense of these solutions. In particular, some time will be devoted to the notion of entropy in systems involving these solutions. For particles sufficiently spaced-out, the second law of thermodynamics will yield dynamics that resemble classical expectations for gravity. Ultimately, gravity will be presented as a force necessary for the preservation of the second law of thermodynamics. Gravity and statistical mechanics will become connected at the quantum domain, provided the quantum domain is enlarged to include wave functions that are generally considered unreasonable.

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