We are made of star stuff.

Dame Susan Jocelyn Bell Burnell\textsuperscript{1}

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In this talk I will consider how the nuclei of atoms such as C, O, Ca, Fe (along with some heavier nuclei such as gold) are created in the cosmos and come to be in our bodies.
Exponential velocity profile of granular flows down a confined heap

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Understanding how small systems exchange energy with a heat bath is important to describe how their unique properties can be affected by the environment. We show how Landsberg's theory of temperature-dependent energy levels can describe the progressive thermalization of small systems as their spectrum is perturbed by a heat bath. We propose a mechanism whereby the system undergoes a discrete series of excitations and isentropic spectrum adjustments leading to a final state of thermal equilibrium. This produces standard thermodynamic results without invoking system size. The thermal relaxation of a single harmonic oscillator is analyzed as a model example of a system with a quantized spectrum than can be embedded in a thermal environment. A description of how the thermal environment affects the spectrum of a small system can be the first step in using environmental factors, such as temperature, as parameters in the design and operation of nanosystem properties.