r-process movie:

What is this about ?

The r-process is responsible for the origin of about half of the elements heavier than iron that are found in nature, including elements such as gold or uranium. Shown is the result of a model calculation for this process that might occur in a supernova explosion. Iron is bombarded with a huge flux of neutrons and a sequence of neutron captures and beta decays is then creating heavy elements.

Calculation:

Adiabaitically expanding neutrino driven wind simulation with electron fraction of 0.45, entropy of 240 (per baryon), and expansion velocity of 4500 km/s. Nuclear physics is from the JINA reaclib database. This approximates a neutrino driven wind situation in a core collapse supernova explosion, with an artificially increased entropy to get a full r-process.

Displayed:

Shown is the evolution of the nuclear abundances on the chart of nuclides. Each square is a nucleus - proton number is the vertical axis, neutron number the horizontal axis. The filled black squares are the stable nuclei. The colors indicate the abundance of the nucleus:

red	>= 1e-4
yellow	~ 1e-5
green	~ 1e-6
blue	~ 1e-7

The model code used for the calculation is from:
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R. Surman, Dept. of Physics, Union College