

Re: Entropy question

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- *From:* Andy Resnick <andy.resnick@xxxxxxxxxxxx>
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Zigoteau wrote:

<snip>

I say 'in principle', because in practice systems with very large numbers of particles cannot be analyzed in a reasonable length of time. That's where statistical mechanics comes in, as an approximation method.

<snip>

Yes, but saying statistical mechanics is an "approximation" to some deeper truth isn't exactly right right either. That's like believing in hidden variables in quantum mechanics. Statistical mechanics also makes a strong statement that microscale physics is not always relevant to the macroscale. That's where entropy comes in, and irreversibility.

<snip>

As I tried to explain in my previous post, in a small container full of gas, the uniform state is stable with respect to small perturbations. However when the volume of gas is of astronomical size, the uniform distribution can become unstable. Local concentrations of gas grow spontaneously, and ultimately form stars. This process is nowhere near equilibrium. The method of analysis I outlined for you involving Fourier decomposition of perturbations is essentially the interplay of Newtonian gravitation and mechanics. Entropy is irrelevant for determining the largest-scale features of the process. Thermodynamics might come in at a lower level, for example in determining the temperature of the local concentration of gas, but there is no way it can be thought of as driving the process. At most, you can bring the entropy in as a way of monitoring what is happening, but it is not guaranteed to be a very good way.

Re: Entropy question

What you describe is similar to a phase transition (maybe that was intentional). Thermodynamics may not be able to provide any details about phase transitions, but statistical mechanics has a lot to say. Statistical mechanics can't say what the density (or temperature) of the gas will be at a specified (x,y,z,t) coordinate, but in terms of the global dynamics, that may not be relevant anyway. To be sure, it's possible to create a system with strong dependence on the specific microstate (turbulence, for example), so that's where the current research on dynamics is.

<snip>

and it's morally superior to getting paralytic on a Saturday night and beating up old ladies, but it's more like religion than science.

That gives me an idea... create a religion where it's morally superior to "getting paralytic on a Saturday night and beating up old ladies"! :) Think there's a market for that? I need beer money.....

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