

Re: Galactic pancake mystery solved

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- *From:* Chris L Peterson <clp@xxxxxxxxxxxxxxxxxxxxxx>
 - *Date:* Fri, 08 Apr 2005 16:01:44 GMT
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On Fri, 08 Apr 2005 09:39:48 -0600, Tim Killian <TJK@xxxxxxxxxxxxxxxxxxxxxx> wrote:

>That said, I'm bothered by the increasing use of computer of simulations
>that are visually appealing (I liken them to video games), but lack any
>depth in their underlying structure.

That is certainly an invalid generalization. Our models only improve with time. Models now being used for studying the climate are very sophisticated, and in some cases are genuinely matching reality down to the level of local weather. Many astrophysical models are similarly sophisticated, showing very close correlation with observations.

> I recently did some work at a small
>university wind tunnel and had a chance to talk to its director. Even
>though it was a modern, well instrumented facility, he was concerned
>that the tunnel would eventually be closed because students and most
>faculty preferred simulations and computer models to the relative
>drudgery associated with actual physical measurements. There is no doubt
>that the computer modeling is less expensive than making physical
>measurements, but are the students learning as much? Do they have a true
>understanding of the code running on the super computer, or are they
>simply awed by the machine? When they go out in the world are they going
>to have the depth of understanding to make meaningful contributions?

Not if they are badly educated. But things like wind tunnels are increasingly obsolete because the computers can do a better job and can deal with parameters that are almost impossible to measure. If the students walk away awed by the machine and not understanding the workings of the simulation, they have been cheated by their teachers, not by the experimental methods.

The real value of simulations, however, is in areas like cosmology where no direct measurement can ever be possible. You design a model, you set it up with what observed data you can, and you make assumptions about what you don't know. You let the simulation run, and if the end result matches your observations, you have faith in both the model and in your assumptions. This is nothing but good, solid scientific method. This

Re: Galactic pancake mystery solved

model that predicts the distribution of local galaxies is a good example. The model simulates known physical processes. It assumes a distribution of cold dark matter. And what comes out precisely matches our observations. This is good science. It is these kinds of experiments, using very different approaches, that are increasingly convincing people that dark matter is a reality.

Chris L Peterson
Cloudbait Observatory
<http://www.cloudbait.com>

- **Follow-Ups:**

- ◆ **Re: Galactic pancake mystery solved**
◇ From: Eric
- ◆ **Re: Galactic pancake mystery solved**
◇ From: Tim Killian

- **References:**

- ◆ **Galactic pancake mystery solved**
◇ From: shneor
- ◆ **Re: Galactic pancake mystery solved**
◇ From: Tim Killian
- ◆ **Re: Galactic pancake mystery solved**
◇ From: Llanzlan Klazmon
- ◆ **Re: Galactic pancake mystery solved**
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- Prev by Date: **Current theories?**
- Next by Date: **NOAA clear air turbulence**
- Previous by thread: **Re: Galactic pancake mystery solved**
- Next by thread: **Re: Galactic pancake mystery solved**
- Index(es):
 - ◆ **Date**
 - ◆ **Thread**