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Letters

Sunshine or moonshine?

"Making Sunshine" (SN: 10/28/89, p.280) would more properly be titled "Delivering Moonshine." John N. Bahcall contends that (1) "the standard solar model . . . has been verified as far as helioseismology can presently go," and (2) oscillation data do not support the idea that the solar interior is cooler than expected. Both statements are misleading. Current data do *not* support the standard model.

Two approaches ("inverse" and "direct") connect helioseismology and internal solar structure. *Primary* inversions (fairly immediate deductions from observed frequencies) suggest unexpectedly high densities and low sound speed near the center. These are problems for the standard model. However, both gross differences agree with the WIMP model — triumphs unique to that theory.

Temperatures cannot be deduced without additional assumptions. One of these — standard radiative transfer — is precisely what the WIMP model questions. Informed inves-

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Cover: New excavations, hieroglyphic decipherments and settlement surveys are transforming scientists' knowledge of the ancient Maya city of Copán and its procession of at least 16 kings. One of those kings, Yax Pac, is depicted here on a carved panel dated at A.D. 775. (Photo: Justin Kerr/Kerr Associates)



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tigators treat any such *secondary* deductions with justified skepticism.

Direct calculations (deducing frequencies from models) are another story. Bahcall's own colleague Ulrich found a family of possible models giving improved fits to the oscillation data alone. If one also adds the requirement of *reducing* the solar neutrino flux, only Ulrich's WIMP-like model survives — with a distinctly cooler interior, of course.

Bahcall's currently favored model employs disconnected "explanations" of solar data with at least two empirical parameters to transform the embarrassing neutrinos out of sight and two (involving helium variations) to match the oscillations. It is a standard solar model only in the specialized sense in which Bahcall uses that term (i.e., whatever *ad hoc* physics he endorses). The helium adjustments are essentially a *post facto* way of recovering the sound-speed behavior already obtained in the WIMP model.

John Faulkner
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Unprecedented inheritance

Recent research on genetic imprinting ("Prader lacks fader; Angelman misses mom?" SN: 11/18/89, p.324) raises an interesting possibility — that some acquired characteristics could actually be passed from an organism to its offspring.

Most speculations as to the mechanism of imprinting postulate that the genetic material of a gamete is temporarily modified in some manner that depends on the gender of the parent. This seems to be saying that the chemical environment of a gamete can modify the expression of its genes. Such a mechanism could then also work to allow factors other than the gender of an individual to affect the expression of genes in its offspring.

If such an effect does exist, a good place to look for it might be in the genes controlling growth. Indeed, it is well known that there has been a gradual increase in the height of the average European since medieval times. The trend is usually explained in terms of better

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