Observations Unexplained by the Standard Solar Model

Comments by scientists at <www.discover.com/mar_02/feat_iron.html> do NOT address observations that are unexplained by the standard solar model - - even with neutrino oscillations and/or injections of alien material from multiple stars:

1. Meteorites trapped two types of xenon, Xe-X (highly enriched in r- and p products) and "normal" xenon [*Nature* **240**, 99-101 (1972)]. Xe-X was a major primordial xenon component at the birth of the solar system. The (excess Xe 136)/(excess-124) ratio is constant in meteorites.

2. Xe-X is closely linked with primordial helium and neon in diverse meteorites but the noble gas component with "normal" xenon is devoid of helium and neon [*Science* **195**, 208-210 (1977); *Icarus* **41**, 312-315 (1980); *Meteoritics* **15**, 117-138 (1980)].

3. Normal xenon is found in troilite (FeS) of meteorites [*Nature* **299**, 807-810 (1982); Geochem. J. 30, 17-30 (1996)], as well as in the rocky planets abounding with Fe and S - - Earth and Mars.

4. Xe-X is found in diamond inclusions of meteorites with abundant primordial helium and neon, trapped in a carbon matrix with normal C-13/C-12 isotope ratio [*Nature* **326**, 160-162 (1987)].

5. The *Galileo* mission found evidence of Xe-X in the helium-rich atmosphere of Jupiter [*J. Radioanal. Nucl. Chem.* **238**, 119-121 (1998)].

6. The *Galileo* mission found hydrogen and helium that could not be transformed into the anomalous hydrogen and helium isotope ratios of the solar wind by deuterium burning [Proceedings 1999 ACS Symposium, "Origin of Elements in the Solar System: Implications of Post-1957 Observations" (Kluwer Plenum Publishers, New York, NY, 2001) pp. 529-543].

7. Primordial helium and neon were plentiful where the outer planets formed, but light elements were absent where formed rocky planets formed. This primordial heterogeneity caused the paucity of light elements in inner planets [*Comments Astrophysics* **18**, 335-345 (1997)].

8. The *Apollo* missions found mass fractionated "normal" xenon implanted in lunar samples by the solar wind, with light mass isotopes enriched by 3.5% per amu [*Science* **174**, 1334-1336 (1971); *Proc. Lunar Sci. Conf.* **2**, 1821-1856 (1972)].

9. When photospheric abundance is corrected for the fractionation seen across the nine isotopes of xenon, the Sun's interior is found to consist mostly of the same even-numbered elements as meteorites [*J. Am. Chem. Soc.* **39**, 856-879 (1917); *Meteoritics* **18**, 209-222 (1983)] confirming that the link of normal xenon with iron and sulfur extends even to the Sun.

10. Light isotopes are less enriched [Proceedings 1999 ACS Symposium, *ibid.*, pp. 529-543] and the *Wind* spacecraft observed drastic enrichments of heavy elements [*Ap. J.* **540**, L111-L114 (2000)] in material ejected by solar flares.

11. The prevalence of solar wind implanted Li-6 and Be-10 in lunar soils is too high to be representative of the composition of the entire Sun [*Nature* **402**, 270-273 (1999); *Science* **294**, 352-354 (2001)].

12. Combined Pu-244/Xe-136 and U/Pb age dating indicates formation of the solar system began about 5 billion years ago, soon after a supernova explosion [*Radiochimica Acta* **77**, 15-20 (1997)].

13. Decay products of short-lived nuclides and isotopic anomalies from nucleosynthesis are found in massive iron meteorites [*Meteoritics & Planet. Sci.*, ***33***, A99 (1998); *Nature* **415**, 881-883 (2002)], as well as in the tiny meteorite inclusions called "interstellar grains".

14. The abundance of one He-burning product, O-16, is characteristic of at least six different types of meteorites and planets [*Earth Planet. Sci. Lett.* **30**, 10-18 (1976)].

The standard solar model does not explain these observations, and they were not addressed by scientists in comments at www.discover.com/mar_02/feat_iron.html

Recent analyses of nuclear data also show that a neutron-rich core may generate high concentrations of hydrogen at a star's surface and in its emissions [32nd *LPSC.*, Abst. #1041 (2001); *J. Fusion Energy* **19**, 93-98 (2001); *J. Radioanal. Chem.* **252**, 3-7 (2002)]. ***Thus, a hydrogen-filled universe is not necessarily populated by hydrogen-filled stars.***

Papers cited are from the University of Chicago, Physikalisches Institut-Bern, NASA Goddard Space Flight Center, the University of Arkansas, CRPG-CNRS at Nancy, the University of California Berkeley, Purdue University, the University of Tokyo, Harvard University, and the University of Missouri-Rolla.