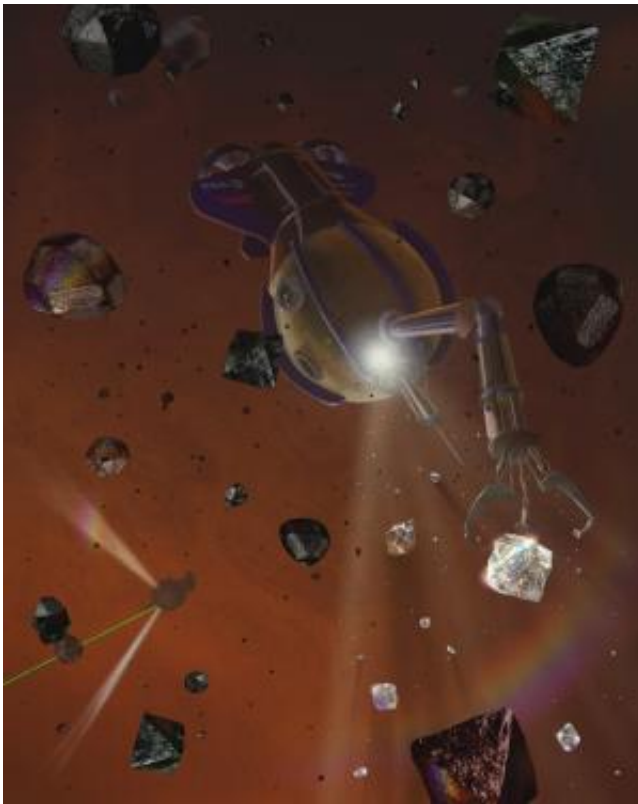


Diamonds in the sky: Scientists find Jupiter and Saturn are awash in diamonds

October 9 2013

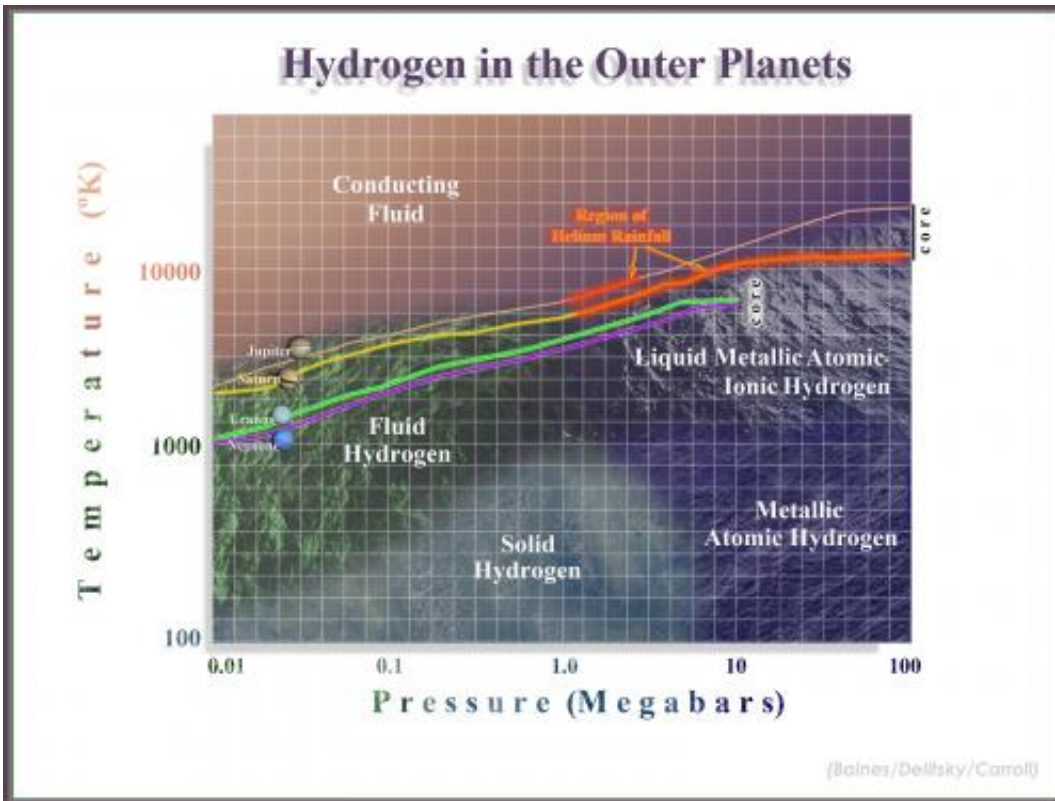


Recent work by planetary scientists has indicated that the deep atmospheres of Jupiter and Saturn may contain chunks of diamond floating in a liquid hydrogen/helium fluid.

Planetary scientists Mona L. Delitsky of California Specialty

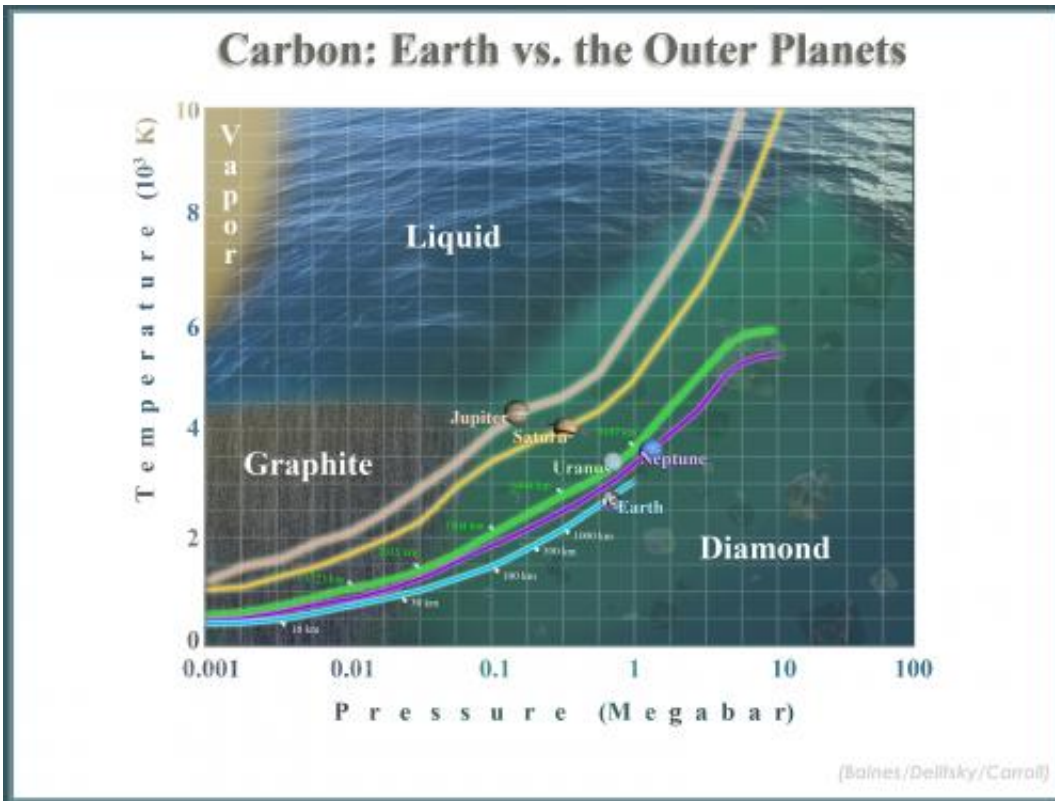
Engineering in Pasadena, California, and Kevin H. Baines of the University of Wisconsin-Madison have compiled recent data about the phase diagram of carbon and combined them with newly published adiabats (pressure-temperature diagrams) for Jupiter and Saturn to calculate that diamond will be stable in the deep interiors. Further, at altitudes below the regions where diamond is stable, the pressures and temperatures will be so large as to melt the diamond into liquid, creating diamond rain or liquid diamond.

Recent publications by Nettelmann et al. (2008, 2011) have reported improved adiabats based on new equations of state for the materials inside of Jupiter and Saturn, and new experiments by researchers at Sandia Laboratories and Lawrence Livermore National Laboratory using shockwave techniques (notably those of Knudson et al. 2008 and Eggert et al. 2010) have given clear boundaries for the different phases of carbon. Delitsky and Baines are reporting that elemental carbon such as soot or graphite generated in Saturn's enormous lightning storms will descend into the planet and will be crushed into [diamonds](#) at deep altitudes and then melted into liquid diamond near the cores of the planets.



While it has been known for 30 years that diamond may be stable in the cores of Uranus and Neptune, Jupiter and Saturn were thought to be too hot or to not have conditions suitable for precipitation of solid diamond. The cores of Uranus and Neptune are too cold to melt diamond. The new data available has confirmed that at depth, diamonds may be floating around inside of Saturn, some growing so large that they could perhaps be called "diamondbergs."





In a recent book, *Alien Seas*, (Springer 2013), edited by renowned space artist Michael Carroll, a chapter by Baines and Delitsky entitled "The Seas of Saturn" was published. Using this new accurate data, a story about robot mining ships plying the deep interior of Saturn in the far distant future and collecting chunks of diamond was described. The artwork (see images, below) shows robot hands reaching out to capture diamonds and collect them for transport to Earth. Because of this new information, theorists Delitsky and Baines report that "diamonds are forever on Uranus and Neptune and not on Jupiter and Saturn."

Provided by California Specialty Engineering

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