

Physics news on the Internet (based on electronic preprints)

1. Amorphous solid water

Scientists from the Pacific Northwest National Laboratory have studied the properties of ‘amorphous solid water’, a noncrystalline ice variety obtained by depositing water vapour onto a cold (below 140 K) surface. While this substance does not form in terrestrial conditions, its content in cosmic ice may be quite noticeable. When water vapour deposited on a carbon tetrachloride substrate, which is slowly heated to about 140 K, the water molecules reorient themselves in accordance with the hexagonal structure of the substrate, to form a crystalline structure. The elastic stresses that develop in this process lead to surface micro-explosions which produce ‘volcano craters’ on the surface.

Source: *Physics News Update*, Number 330

<http://www.hep.net/documents/newsletters/newsletters.html>

2. Effects of X-rays on conductivity

American and Japan (Tokyo University) scientists have reported evidence that certain insulators may become conductors when subject to X-ray radiation. A number of praseodymium-based compounds were studied whose electrical conductivity is known to be greatly affected by application of a magnetic field. The scientists believe the work could have applications in X-ray detection and computer technology.

Source: <http://www.pubaf.bnl.gov/>

3. Far galaxy

Investigations of the vicinity of a cosmic gravitational lense using the Hubble and 10-meter Keck telescopes have spotted the farthest galaxy ever observed. Assuming the Universe to be 14×10^9 years old, a red shift estimate places the object at about 13×10^9 light years away. The gravitational lense is an accumulation of galaxies approximately 5×10^9 light years from Earth, the total magnification being 5 to 10 times larger than that of the Hubble telescope. The young galaxy is more than 10 times brighter than ours, is rather unusually colored (due to light scattering), and contains a number of condensations of young massive stars. The velocity of a gas flow in a galaxy that far away was measured for the first time and found to be about 200 km s^{-1} , the flows being presumably due to supernova bursts. The fast flows observed indicate that galaxies release much of their gas into intergalactical space at their early evolution stages.

Source: *NASA Press Releases*

<http://www.hq.nasa.gov/office/pao/NewsRoom/releases.html>

4. Hydrogen fluoride

In addition to the about 100 molecular types found in interstellar space over the past 30 years, the first observation of hydrogen fluoride molecules is reported. The cloud is not far away from the centre of the Galaxy and was observed in infrared using a European Space Agency satellite. The concentration of hydrogen fluoride relative to other molecules, primarily hydrogen, is 10^{-9} . Since the Earth’s atmosphere is opaque to infrared, such observations are only possible in space.

Source: <http://unisci.com/>

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