


[Latest News](#) [Cummins Filtration Engineers Recognized for Research on Nanofiber Engine Air Filter Design](#)


- [Home](#)
- [Directory](#)
- [Content](#)
 - [News](#)
 - [Articles](#)
 - [Podcasts](#)
 - [Videos](#)
 - [Events](#)
 - [Courses](#)
 - [Books](#)
 - [Jobs](#)
 - [Classifieds](#)
- [Products](#)
- [Journal](#)
- [Information](#)
- [Request Quote](#)

Advertise



Advertise Here

Very Cold Ice Films Solving the Mysteries of the Universe

Ads by Google

[Pipe Repair Made Easy](#)

Qwik Freezer Portable Pipe Freezing Equipment for pipes 3/8 to 8 Inches
www.QwikFreezer.com

[75 Hotels in Granada](#)

Book your hotel in Granada online. Find your hotel on a city map!
www.booking.com/Granada-Hotels

[Space Frames, Domes](#)

Architectural Structures allow Innovative Designs & Shapes
www.triodetic.com

[Vuelos a Granada, 28€](#)

Ofertas Vuelos regulares y Low Cost ¡Ahorra tiempo y dinero con logi!
www.logitravel.com

[Hoteles Baratos Granada](#)

Hotel a precio de hostel y hostel a precio de andar por casa. ¡Reserva!
Hoteles-Granada.es.Ask.com

Most of the ice is on dust grains because there are so many of them, but some ice is on larger bodies such as asteroids, comets, cold moons or planets, and occasionally planets capable of supporting life such as Earth. At low temperatures, ice can form different structures at the mesoscale than under terrestrial conditions, and in some cases can be amorphous in form, that is like a glass with the molecules in effect frozen in space, rather than as crystals. For ice to be amorphous, water has to be cooled to its glass transition temperature of about 130 K without ice crystals having formed first. To do this in the laboratory requires rapid cooling, which Cartwright and colleagues achieved in their work with a helium "cold finger" incorporated in a scanning electron microscope to take the images.

As Cartwright observed, ice can exist in a combination of crystalline and amorphous forms, in other words as a mixture of order and disorder, with many variants depending on the temperature at which freezing actually occurred. In his latest work, Cartwright and colleagues have shown that ice at the mesoscale comprises all sorts of different characteristic shapes associated with the temperature and pressure of freezing, also depending on the surface properties of the substrate. For example when formed on a titanium substrate at the very low temperature of 6K, ice has a characteristic cauliflower structure.

Most intriguingly, ice under certain conditions produces biomimetic forms, meaning that they appear life like, with shapes like palm leaves or worms, or even at a smaller scale like bacteria. This led Cartwright to point out

Could life have started in a lump of ice?The universe is full of water, mostly in the form of very cold ice films deposited on interstellar dust particles, but until recently little was known about the detailed small scale structure.

Now the latest quick freezing techniques coupled with sophisticated scanning electron microscopy techniques, are allowing physicists to create ice films in cold conditions similar to outer space and observe the detailed molecular organisation, yielding clues to fundamental questions including possibly the origin of life. Researchers have been surprised by some of the results, not least by the sheer beauty of some of the images created, according to Julyan Cartwright, a specialist in ice structures at the Andalusian Institute for Earth Sciences (IACT) of the Spanish Research Council (CSIC) and the University of Granada in Spain.

Recent discoveries about the structure of ice films in astrophysical conditions at the mesoscale, which is the size just above the molecular level, were discussed at a recent workshop organised by the [European Science Foundation \(ESF\)](#) and co-chaired by Cartwright alongside C. Ignacio Sainz-Diaz, also from the IACT. As Cartwright noted, many of the discoveries about ice structures at low temperatures were made possible by earlier research into industrial applications involving deposits of thin films upon an underlying substrate (ie the surface, such as a rock, to which the film is attached), such as manufacture of ceramics and semiconductors. In turn the study of ice films could lead to insights of value in such industrial applications.

But the ESF workshop's main focus was on ice in space, usually formed at temperatures far lower than even the coldest places on earth, between 3 and 90 degrees above absolute zero (3-90K).

[Back One](#)
[ShareThis](#)


Advertise Here

that researchers should not assume that lifelike forms in objects obtained from space, like Mars rock, is evidence that life actually existed there. "If one goes to another planet and sees small wormlike or palm like structures, one should not immediately call a press conference announcing alien life has been found," said Cartwright.

On the other hand the existence of lifelike biomimetic structures in ice suggests that nature may well have copied physics. It is even possible that while ice is too cold to support most life as we know it, it may have provided a suitable internal environment for prebiotic life to have emerged.

"It is clear that biology does use physics," said Cartwright. "Indeed, how could it not do? So we shouldn't be surprised to see that sometimes biological structures clearly make use of simple physical principles. Then, going back in time, it seems reasonable to posit that when life first emerged, it would have been using as a container something much simpler than today's cell membrane, probably some sort of simple vesicle of the sort found in soap bubbles. This sort of vesicle can be found in abiotic systems today, both in hot conditions, in the chemistry associated with 'black smokers' on the sea floor, which is currently favoured as a possible origin of life, but also in the chemistry of sea ice."

This is an intriguing idea that will be explored further in projects spawned by the ESF workshop. This may provide a new twist to the idea that life arrived from space. It may be that the precursors of life came from space, but that the actual carbon based biochemistry of all organisms on Earth evolved on this planet.

Posted November 6th, 2008

Post a comment, start a discussion or ask a question at [Social.Nanotech](#) - AZoNano's Social Network for Nanotech professionals...

[Nanotechnology News - Interview with Dr. Adil Adamjee form AVT Services, Swimming Nano-machines, Jellyfish and DNA and More...](#) **NEW**

Total running time 23.55 mins, File size: 16.4 Mb, File Type: mp3



[Promote your product or service in the weekly new podcast - Contact [Rolf Easto](#)]



*This episode of AZoNano News is brought to you by **Malvern Instruments**, a world leader in innovative solutions for material characterization challenges.*

In this edition of AZoNano News, as well as bringing you the latest news from the international Nanotechnology industry, we'll hear about a nano-machine that has been taught to swim, how jellyfish are helping to overcome diseases of the brain and how researchers have discovered that DNA is actually much softer that it appears. In this week's AZoNano Interview, Cameron Chai speaks to Dr. Adil Adamjee form AVT Services about their soon to be released ALD and its key features that make it stand out from other systems on the market.

[Nanotechnology News Archive](#)

[Δ Top](#)

[Back One](#)



AZoNano is grateful for the support provided by our [sponsors](#) to both AZoNano.com and to the authors and peer reviewers of [AZoJono -Journal of Nantechnology Online](#) - open access to leading Nanotech Science.

Please visit our [sponsors page](#) or click the links below to view the world leading products and services our [sponsors](#) have to offer. To discuss an AZoNano sponsor package please contact our [Sales and Marketing Manager](#)



Other AZoNetwork Sites | [AZoM.com](#) | [AZoBuild.com](#) | [AZoOptics.com](#) | [AZoCleantech.com](#) | [News-Medical.Net](#)

Use of this website is governed by these [Terms and Conditions](#).

AZoNano - The A to Z of Nanotechnology...Copyright © 2008 by AZoM.com Pty.Ltd