seminars

pequeño es diferente nology: small is different

Tuesday 21st February 15:30h

c/Faraday, 9 Conference Hall Imdea Nanociencia Ciudad Universitaria de Cantoblanco

Is liquid helium an absolutely "pure liquid"? Prof. Conrado Rillo ICMA, CSIC-Universidad de Zaragoza, Spain

The purity of liquid helium was already a subject of much interest in the 1970's due to its importance, for example, in the efficiency of the production of ultra cold neutrons. In the last decades a recurrent worldwide issue, the flow impedance blocking in helium evaporation cryostats and dilution refrigerators (T < 4.2 K), also ascribed to the presence of impurities in liquid helium, has become more and more frequent. The problem is causing tremendous helium losses and delays in research at low temperatures, all over the world.

We have proposed a plausible mechanism to explain the issue and have implemented a proven solution, based on the "Advanced Technology" for Purification (ATP) and Liquefaction (ATL) of helium at the small scale.

In this talk, after a brief introduction of the subject of liquid helium purity, and, of the applications of helium, the fundamentals of the ATP and ATL technologies are given in detail1. Finally, the recently developed concept of "Clean Helium Recovery Plant"2, that completely solves the flow impedance blocking issue, is presented.

[1] Enhancement of the Liquefaction Rate in Small-Scale Helium Liquefiers Working Near and Above the Critical Point. C. Rillo et al. Phys. Rev. Applied 3, 051001 – Letter - Published 8 May 2015.

[2] Hydrogen-Free Liquid-Helium Recovery Plants: The Solution for Low-Temperature Flow Impedance Blocking. M. Gabal et al. Phys. Rev. Applied 6, 024017 – Research Article - Published 26 August 2016.







