

Quest for Randomly Networked Superfluidity of ^3He in Porous Glass

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There have been numerous studies on ^4He in nanoporous material such as Vycor glass or Gelsil glass. The effect of confinement in nanometer channels changed the properties of liquid and solid ^4He . These systems are very interesting because the characteristic length scale of ^4He system such as superfluidity is in the atomic scale and the size of pores are several times larger than the length scale so that the system under interest exist in a little influenced manner. For the case of ^3He the coherence length of superfluid wave function is in the order of 10nm so that the pores in Vycor Glass is too narrow to form successful Cooper pairs of ^3He inside. Although the structure is very different from that of the Vycor glass, aerogel has been attracting interests of many researchers on Superfluid ^3He because it was found to be the first successful porous material to affect the superfluidity of ^3He . After a long struggle to understand the nature of superfluidity in aerogel, people more or less come to understand what is the nature of superfluid ^3He in aerogel. In this work we report on our experimental search for another system of confined superfluid ^3He in a porous material which has similar geometric shape to the Vycor glass with its diameter several times larger than the coherence length of the bulk superfluid ^3He .