O1.7 Direct Observation of a Majorana Quasiparticle Heat Capacity in ^{3}He

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The Majorana fermion, which acts as its own antiparticle, was predicted by Majorana in 1937. No fundamental particles are known to be Majorana fermions, although there are speculations that the neutrino may be one. There is also theoretical speculation that Majorana fermions may comprise a large fraction of cosmic Dark Matter. While no stable particle with Majorana properties has yet been observed, Majorana *quasi*particles may exist at the boundaries of topological insulators. Here we report the preliminary results of direct observation of Majorana quasiparticles by deviation of superfluid ^{3}He heat capacity. The superfluid ^{3}He heat capacity falls exponentially with temperature. The Majorana heat capacity follows a power law. By reanalyze the data, published in the article [1] we have found a 10% deviation from exponential law heat capacity at the temperature of 135 μK in a good agreement with the theory [2]. No any fitting parameters was involved in the analyze. The experiments are in progress.

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O1.8 Magnon BEC in antiferromagnets with Suhl-Nakamura interaction

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The Bose-Einstein condensation (BEC) of magnons and Spin Superfluidity were discovered in 1984 in superfluid ^{3}He-B [1]. It manifests itself by coherent precession of magnetization, even in presence of the inhomogeneous static magnetic field. For the last 25 years 5 different magnon BEC states in superfluid ^{3}He have been found [2]. The possibility of Spin Superfluidity in antiferromagnets with couped nuclear-electron precession was predicted by Yu.M. Bunkov [3]. It can take place in the antiferromagnets with so-called Suhl-Nakamura interaction. The predictions were successfully confirmed. It was found that the coupled nuclear-electron precession shows all properties of coherent spin precession and magnon BEC [4]. This study was partly supported by the Siberian Branch of the Russian Academy of Sciences (Grant N28).

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