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On the existence of superfluidity between two critical temperatures ILYA GRIGORENKO, ROMAN KEZERASHVILI, New York City College of Technology — It is predicted the existence of the superfluid state between two critical temperatures. Superfluidity on a finite temperature interval can be observed in a system when the pairing takes place between two types of carriers, with the asymmetry caused by the difference in the carriers masses and their chemical potentials. It is found that the superfluid state is possible in a wide range of the asymmetry parameters, when they satisfy a simple linear relation. We also predict that at zero temperature with the change of the asymmetry parameters the system can undergo a quantum phase transition of the first order.

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