

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Theory of superconductivity by the edge states in graphene KEN-ICHI SASAKI, MASAHIRO SUZUKI, RIICHIRO SAITO, Tohoku University — Superconductivity in graphite intercalation compound and carbon nanotubes has been attracting much attention due to its high superconducting transition temperature above 10 K. However, the density of states (DOS) near the Fermi energy of graphene is not sufficient to explain the observed high transition temperature. Thus, the mechanism of the superconductivity is an important issue. The STS measurements (Kobayashi et al., PRB73,125415, Niimi et al., PRB73,085421) show an anomalous DOS near the Fermi level of graphene which is relevant to localized edge states. The edge states significantly enhance the local DOS near the zigzag edge. Thus, it is valuable to examine the effect of the edge states on the superconductivity. Using the Eliashberg equation, we obtain an appreciable transition temperature for the edge states. We found that the effects of the Coulomb interaction and Fermi energy position are sensitive to the formation of superconducting gap. We will discuss the condition for observing the edge state superconductivity. (Sasaki et al., J. Phys. Soc. Jpn. 76, 033702 (2007))

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Date submitted: 24 Nov 2007

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