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**Andreev conversion of quantum Hall edge state in graphene** GIL-HO LEE, SEAN HART, DI WEI, KATIE HUANG, Harvard University, DMITRI EFETOV, MIT, TAKASHI TANIGUCHI, KENJI WATANABE, NIMS, AMIR YACOBY, PHILIP KIM, Harvard University — Understanding the interplay between superconductivity (SC) and quantum Hall effect (QHE) has been a long-sought theoretical and experimental problem. SC contacts to QHE systems enable us to study interesting physics, such as Cooper pair injection into ballistic 2D channels, Andreev edge states, and emergent excitations of non-Abelian anyons. We developed an in-situ etching technique for highly transparent superconducting contact (NbN) to hBN encapsulated graphene channels. The high critical field of NbN electrodes ($H_{c2} > 30$ T) and the high quality of our graphene devices allows us to experimentally access a wide range of magnetic field where SC and QHE coexist. In order to probe the Andreev conversion of QH edge states, we measure the chemical potential of normal electrodes located on the upstream and the downstream QH edge states relative to a narrow grounded superconducting electrode. We observed that the chemical potential in downstream has sign opposite to the one measured in upstream suggesting Andreev conversion of incident electrons to outgoing holes across the narrow superconducting contact. We systematically investigated this phenomena as a function of temperature, magnetic field, bias voltage and the width and length of the superconducting electrode.

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