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Bulk excitonic currents in a bilayer quantum Hall system and Andreev reflection A.D.K. FINCK, J.P. EISENSTEIN, California Institute of Technology, L.N. PFEIFFER, K.W. WEST, Princeton University — Bilayer 2D electron systems in the quantum Hall regime can support a novel interlayer coherent phase which may be viewed as a Bose condensate of interlayer excitons. While numerous experiments over the past decade have revealed a host of remarkable properties of this strongly correlated quantum fluid, heretofore none have directly demonstrated the transport of excitons across the electrically insulating bulk of the system. We report here just such an observation. Our experimental results show that excitons may be launched into the bulk of the 2D system via a process analogous to Andreev reflection. Excitons are emitted into the bulk of the bilayer when electrons are injected into one 2D layer and withdrawn from the other along a common edge of the system. Similarly, we demonstrate that excitons arriving at the edge of the Hall droplet can drive current through external circuitry connected to contacts along that edge.

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