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Thermoelectric transport in a two-dimensional Bose gas¹

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We demonstrate a new scheme to extract particle and energy flow induced by temperature gradients; equivalent to “thermoelectricity” in electronic materials. From in situ images, we analyze the density and energy redistribution of two-dimensional Bose gases in the presence of three-body inelastic collisions. We determine the thermopower and the Lorenz number, both showing interesting behavior in the quantum degenerate regime. Thermopower changes sign suggesting the emergence of superfluid counterflow; the Lorenz number approaches zero, contrasting with the Wiedemann-Franz law.

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