An Exact Solution for the Half-filled Lowest Landau Level EMIL
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exact solution for the interacting electron gas in the half-filled lowest Landau level
on a thin torus. The low energy sector consists of non-interacting, one-dimensional,
neutral fermions (dipoles). The ground state, which is homogeneous, is the Fermi
sea obtained by filling the negative energy states and the excited states are the
gapless neutral excitations out of this one-dimensional sea. We identify this ground
state as a version of the Rezayi-Read state, and find that it develops continuously, as
the circumference grows, into the Rezayi-Read state that is believed to describe the
observed metallic phase in the two-dimensional system. This suggests a Luttinger
liquid description of the half-filled Landau level.

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