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Heat equation approach to geometric changes of the torus Laughlin-state[1] ZHENYU ZHOU, ZOHAR NUSSINOV, ALEXANDER SEIDEL, Washington University in St. Louis — We study the second quantized -or guiding center- description of the torus Laughlin state. Our main focus is the change of the guiding center degrees of freedom with the torus geometry, which we show to be generated by a two-body operator. We demonstrate that this operator can be used to evolve the full torus Laughlin state at given modular parameter τ from its simple (Slater-determinant) thin torus limit, thus giving rise to a new presentation of the torus Laughlin state in terms of its "root partition" and an exponential of a two-body operator. This operator therefore generates in particular the adiabatic evolution between Laughlin states on regular tori and the quasi-one-dimensional thin torus limit. We make contact with the recently introduced notion of a "Hall viscosity" for fractional quantum Hall states, to which our two-body operator is naturally related, and which serves as a demonstration of our method to generate the Laughlin state on the torus.

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