Theoretical Studies of Quantum Hall Edge States

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Introduction

Quantum Hall (QH) liquids represent novel states of matter with non-trivial topological order. Consequences of such topological order include chiral edge excitations with predicted universal properties. We have performed a variety of theoretical studies on these states.

Methods of Theoretical Studies and Results

One complication associated with QH edge states is edge reconstruction. In Refs. [1] and [2] we studied the role of spin degrees of freedom in edge reconstruction, for integer and fractional QH states respectively. In Ref. [3] we made a theoretical proposal of using quantum dot mediated edge state transport to distinguish between Pfaffian and anti-Pfaffian states that may have been realized in the 5/2 fractional quantum Hall liquid. We found that that quantum dot mediated edge state transport can provide a clear distinction between Pfaffian and anti-Pfaffian states.

Conclusions

We have performed comprehensive theoretical studies on QH edge states. Our results have provided new methods to probe these novel states of matter.

Acknowledgements

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References

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