

DISORDER-INDUCED LOCALIZATION OF EXPANDING QUANTUM DROPLETS

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Abstract

We study the expansion of a one-dimensional quantum droplet in a speckle potential using the generalized Gross-Pitaevskii equation. We compute the droplet width, density profiles, diffusion exponent and coefficient, and localization length for both small and large droplets. Interesting classes of anomalous diffusion are observed in the transport dynamics, ranging from hyperballistic behavior in the free case to subdiffusion under strong disorder. We find that above a certain critical disorder strength, the droplet undergoes a transition to Anderson localization.

References

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