Wave packet dynamics in monolayer and bilayer graphene rings.

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In monolayer and bilayer graphene quantum rings, the time evolution of a gaussianly populated wave packet shows revivals. Revivals appear when wave packets return, in their temporal evolution, to a shape that is very similar to the initial shape[1,2]. The time it takes for this phenomenon to occur depends on the energy eigenvalue spectrum. We have found revival time as an observable that shows different values for monolayer and bilayer graphene quantum rings allowing to distinguish them. In addition, the revival time shows the breaking valley degeneracy. In our study, we have used two different models (a continuum model and Density Functional Theory) to calculate the energy spectrum of these systems and studied the difference in revival times among these nanostructures. We have also studied the behaviour of the revival times for quantum rings in a perpendicular magnetic field.

References

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