The Worldline Method for Electromagnetic Casimir Energies

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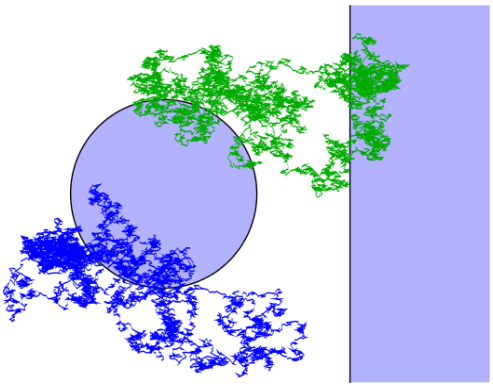
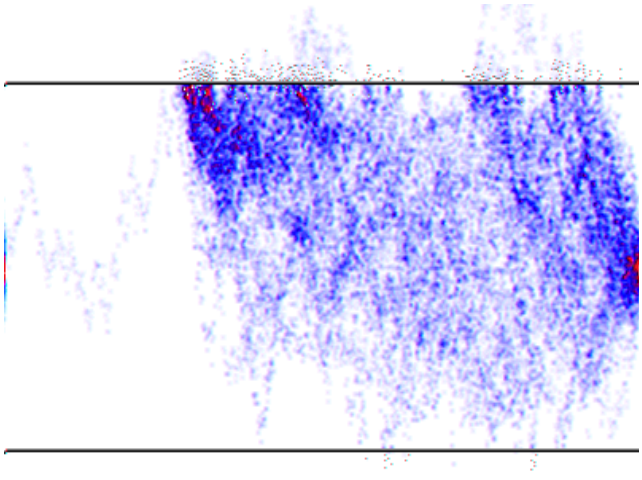
PhD Defense

Time: Friday, May 26 at 1pm
Location: OMQ Conference Room, WIL 240

Abstract:
The Casimir effect refers to the primarily attractive force between material bodies due to quantum fluctuations in the electromagnetic (EM) field. (Van der Waals forces and Casimir forces are essentially the same forces.) The Casimir effect is difficult to calculate in general, and in general requires a numerical approach.
The worldline method computes Casimir energies by creating an ensemble of space-time paths corresponding to a virtual particle interacting with the bodies.
I will discuss our work in generalizing the worldline method to EM fields.
We have split the EM field between planar bodies into two scalar polarizations, and developed analytical and numerical techniques for evaluating the associated worldline.
I will present results showing the EM worldline methods reproduce known results.
Finally, I will discuss the prospects for generalizing these results to arbitrary geometries.





Q: Why did the gecko cross the ceiling?
A: To get to the other side.
Q: How did the gecko get to the ceiling?
A: van der Waals.
A2: There are no more geckos or “jokes” in the talk. Just path integrals. So many path integrals.