DIFFUSION IN A CANTOR SET

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With the objective of studying diffusion processes in systems with scatterers distributed in an irregular way, we have used a one-dimentional random walk model scattered by a Cantor set. Despite being deterministic, the fractal form of a Cantor set has allowed its use as a model for stochastic processes characterized by Lévy walks (R. Burioni, et. al. Phys. Rev. E 81, 2010, 011127), which are relevant in many physical, chemical and biological phenomena. We have developed a random walk with steps and discreet time, alternating stretches of ballistic walk and direction change possibility in some points that we called as scatterers. The scatterers are distributed according to a Cantor set and its ballistic walk develops among them. We called generation the number of times in which the Cantor construction routine is implemented. The generation of implemented Cantor set determines the quantity of scatterers in the system. The system has a fixed length L and all particles start at position 0 and finish at position L. The particles that return to the initial position are reflected and when reach the final position are withdrawn from the system. Our intermediate results show normal diffusion from the tenth generation on. Except for generation 0, which presents purely ballistic movement, the generations below the tenth show subdiffusion in a long time.