An adaptive statistical test to detect non Brownian diffusion from particle trajectories

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Assessing the dynamics of particles inside live cell is of paramount interest to understand cell mechanisms. In this presentation, we assume that the motions of particles follow a certain class of random process : the diffusion processes. Our contribution is to propose a statistical method able to classify the motion of the observed trajectories into three groups : Subdiffusion (the particle is trapped in a confined domain or moves in a crowded area), superdiffusion (the particle moves in a specific direction thanks to a molecular motor) and free diffusion (namely Brownian motion). This method is an alternative to Mean Square Displacement (MSD) analysis. We assess our procedure on both simulations and real cases. This is a joint work with the supervisors of my PhD Myriam Vimond and Charles Kervrann.