# Oscillation of *Physarum polycephlum* plasmodia wavefront in electrotaxis

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## ABSTRACT

**Physarum polycephalum was shown to move towards negatively charged electrode in the presence of an electric field. We monitor the plasmodial wavefront and performed traction microscopy to determine the force generation dynamics in the wavefront. The bead dynamics shows non-Gaussian properties. Moreover, oscillatory components are observed.**

## MOTIVATION

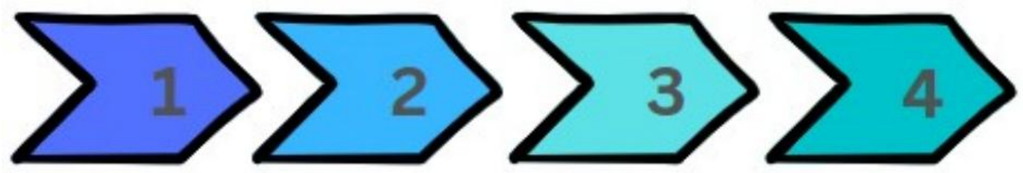
**To understand the dynamics of the Physarum polycephalum plasmodia wavefront towards the beads embedded on the agar substrate.**

## METHODOLOGY

**Experimentall setup**

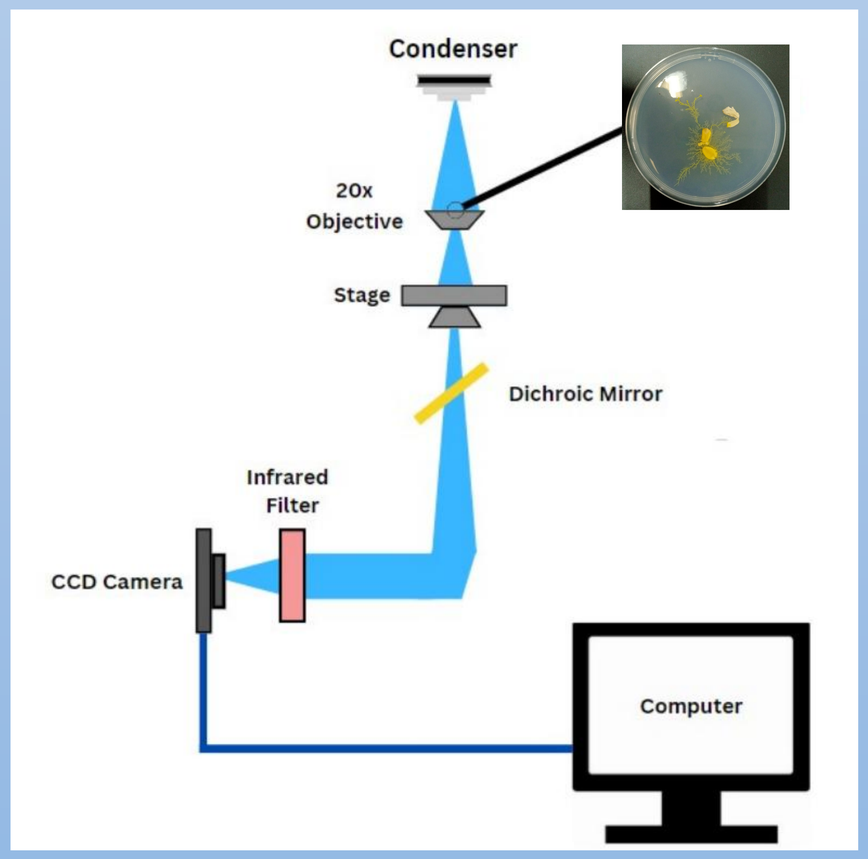
**Culture a *Physarum polycephalum*.**

**Extraction of images.**




**Take a video of the *P. polycephalum* under a microscope.**

**Data Processing**

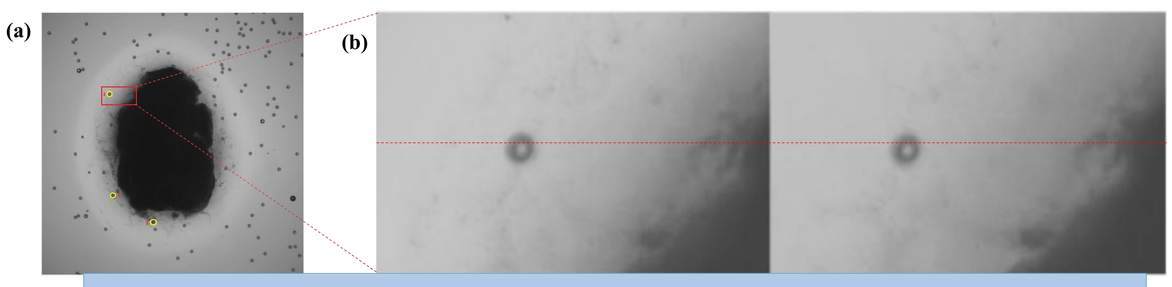



**Schematic diagram for the experimental setup**

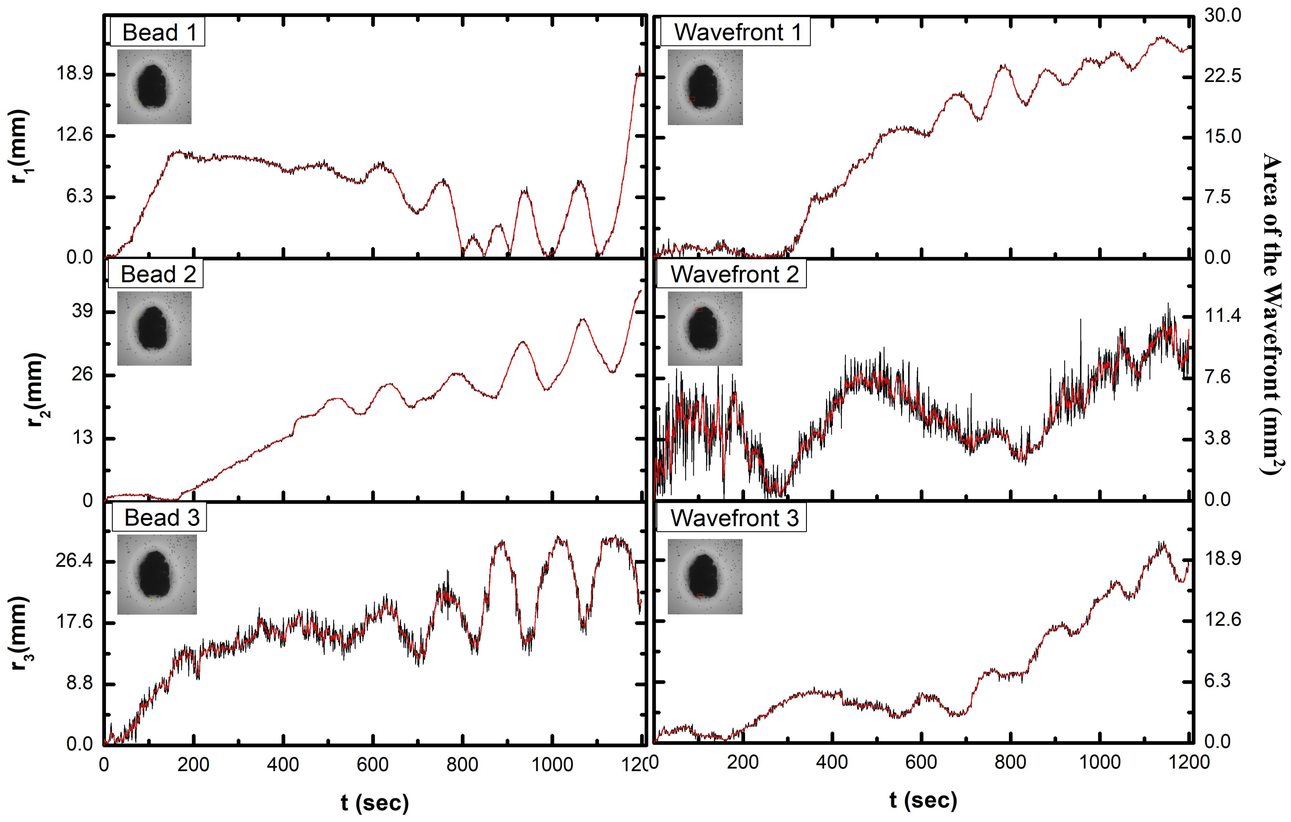
## SUMMARY

- **Under a video microscopy, it was observed that the wavefront of the plasmodia dynamicaly change the trajectory of the beads.**
- **Correlating the trajectory of the beads and the nearest plasmodial wavefront over time.**
- **MSD shows that there's a fluctuation of the movementt of the bead in the change of time.**
- **At a longer tiime scales, the VHD shows multi-peaks.**

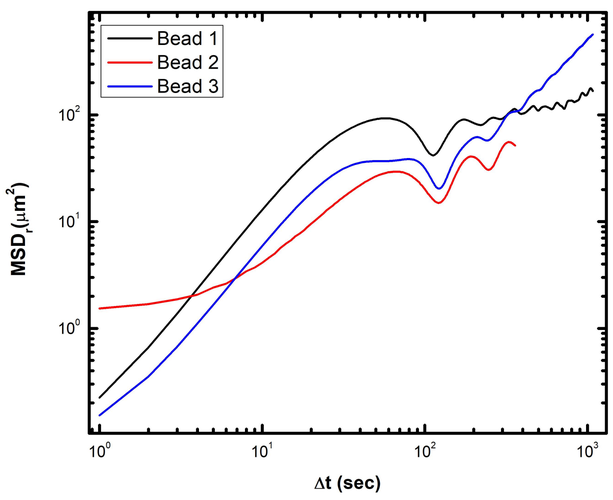
## RESULTS



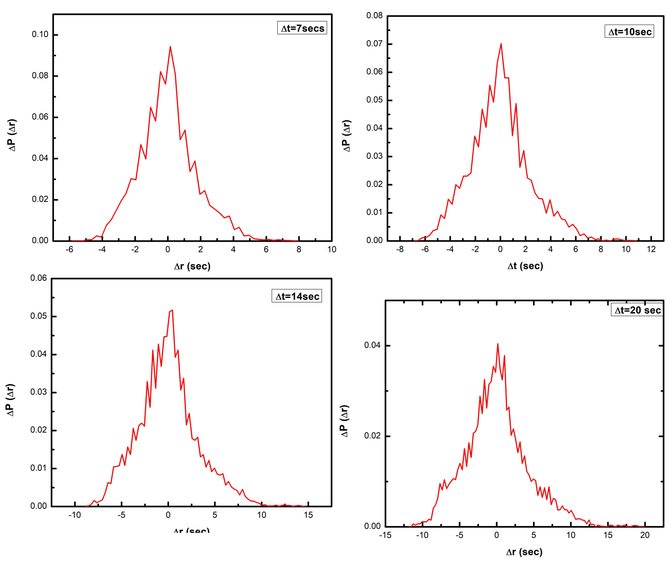

**(a) An image of a cultured Physarum polycephalum plasmodia captured under a video microscopy. (b) Trajectory of a tracked bed from t=0s to t=1200s.**




**Correlation of the trajectory of the tracked beads and the area of the wavefront with respect to time (t).**




**Mean Square Displacement of the tracked beads**




Van Hove Disteibution of Bead 1

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