

# Electronic Supplementary Information for “Self-propelled Semiflexible polymer in a gliding assay: reentrant transition, role of turnover and activity”

Amir Shee<sup>‡, •</sup>, Nisha Gupta<sup>\*</sup>, Abhishek Chaudhuri<sup>†</sup>, and Debasish Chaudhuri<sup>‡, •</sup>

<sup>‡</sup>Institute of Physics, Sachivalaya Marg, Bhubaneswar 751005, India

<sup>•</sup>Homi Bhabha National Institute, Anushaktinagar, Mumbai 400094, India

<sup>\*</sup>Department of Physics, Indian Institute of Technology Palakkad, Palakkad 678557, India

<sup>†</sup>Indian Institute of Science Education and Research Mohali, Knowledge City, Sector 81, SAS Nagar 140306, Punjab, India

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## 1 Phase boundary

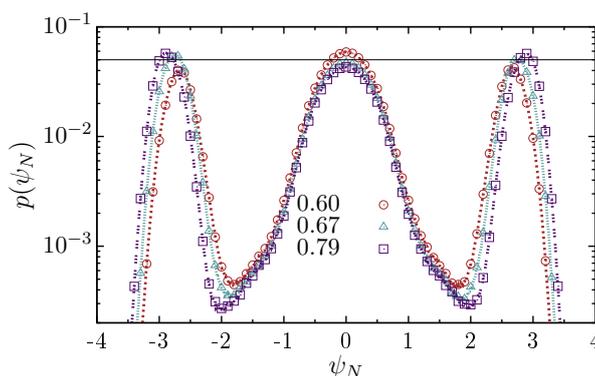


Figure 1: (color online) Probability distribution functions of turn number  $p(\psi_N)$  for different  $Pe = \tilde{P}e \times 10^5$  where values of  $\tilde{P}e$  are denoted in the figure legend, at a fixed ratio  $\omega_{on}/\omega_0 = 1$ .

The triple- maxima in the probability distribution of turn number  $p(\psi_N)$  characterize the coexistence in transition from open chains to spirals. The transition point is identified by the  $Pe$  value at which the three maxima are of the same height, such that spirals and open state are equally probable. Fig. 1 shows that the transition point is near  $Pe = 6.7 \times 10^4$ .

## 2 Description of videos

The six videos in the ESI show example simulations of a filament with  $Pe = 10^5$  and the attachment- detachment ratio  $\omega_{on}/\omega_0 = 1.0$  from the three different dynamical regimes: the

spiral regime (S1.mp4 clockwise spiral, and S2.mp4 anti-clockwise spiral), the formation of spiral from open chain (S3.mp4 clockwise spiral, and S4.mp4 anti-clockwise spiral), the breaking of spiral (S5.mp4 clockwise spiral, and S6.mp4 anti-clockwise spiral). The time difference between two consecutive frames are  $\delta t = 1.6 \times 10^{-5} \tau$ . In the movies the end-monomers marked by filled circle denote the direction to which the filament is actively driven by the MPs.

### 3 Description of data

We supply a large set of time series data along with explanatory notes in the Github repository <https://github.com/amirshee93/Semiflexible-Polymer-in-a-gliding-assay-reentrant-transition-role-of-turnover-and-activity> to enable readers to perform independent analysis. This includes all the time series data for turn number  $\psi_N$  at all  $Pe$  values we studied at  $\omega_{\text{on}}/\omega_0 = 1.0$ . Twenty independent time series data for each  $Pe$  are provided. In addition, we supply similar number of time series data for  $\psi_N$  at various  $Pe$  values corresponding to smoothened chains with reduced bond lengths  $r_0 = 0.75 \sigma$  and  $0.5 \sigma$ .