Electronic Supplementary Information for:
Collective Dynamics of Self-propelled Semiflexible Filaments

Ozer Duman, Rolf E. Isele-Holder, Jens Elgeti, and Gerhard Gompper
Theoretical Soft Matter and Biophysics, Institute of Complex Systems and Institute for Advanced Simulation,
Forschungszentrum Jülich, 52425 Jülich, Germany

I.   DESCRIPTION OF THE MOVIES

Movie M1   *(M1 cluster_collisions.mov)* Nematic-alignment mechanism in cluster collisions in the giant cluster regime.
Parameters: persistence length $\xi_p/L = 8$, Peclet number $Pe = 50$, aspect ratio $a = 25$, area fraction $\phi = 0.2$.

Movie M2   *(M2giant_clusters.mp4)* Formation and dynamics of a giant cluster.
Parameters: $\xi_p/L = 16$, $Pe = 150$, $a = 25$, $\phi = 0.2$.

Movie M3   *(M3gas_of_clusters.mp4)* Rapid formation and disentegration of clusters in the gas of clusters regime.
Parameters: $\xi_p/L = 16$, $Pe = 1500$, $a = 25$, $\phi = 0.2$.

Movie M4   *(M4reorientation.mp4)* Depiction of the ease in reorientations of filaments among a cluster upon collisions.
Parameters: $\xi_p/L = 1$, $Pe = 50$, $a = 25$, $\phi = 0.2$.

Movie M5   *(M5spiral_break_up.mp4)* Inhibited spiral formation at low aspect ratios due to collisions with other filaments.
Parameters: $\xi_p/L = 0.1$, $Pe = 4300$, $a = 25$, $\phi = 0.2$.

Movie M6   *(M6spiral_dynamics.mp4)* dynamics of Gas of spirals.
Parameters: $\xi_p/L = 0.1$, $Pe = 10000$, $a = 100$, $\phi = 0.2$.

Movie M7   *(M7jamming.mp4)* Jamming state at high densities.
Parameters: $\xi_p/L = 0.4$, $Pe = 0.9$, $a = 30$, $\phi = 0.8$.

Movie M8   *(M8laning.mp4)* Laning state at high densities.
Parameters: $\xi_p/L = 0.4$, $Pe = 24.3$, $a = 30$, $\phi = 0.8$.

Movie M9   *(M9turbulence.mp4)* Active turbulence state at high densities.
Parameters: $\xi_p/L = 0.4$, $Pe = 180$, $a = 30$, $\phi = 0.8$.