

Soft Matter Physics: Seminar Topics

1. Thermodynamic Aspects of Intermolecular Forces (Israelichvili Chap. 2)
2. Covalent and Coulomb Interactions (Israelachvili Chap. 3)
3. Interactions involving polar molecules (Israelachvili chap. 4)
4. Interactions involving the polarization of molecules (Israelachvili chap. 5)
5. Repulsive forces, total intermolecular pair potentials and liquid structure (Israelachvili chap. 7)
6. Particle-surface interactions and interfacial energy (Israelachvili chap. 9)
7. Contrasts between intermolecular, interparticle and intersurface forces (Israelachvili chap. 10)
8. Van der Waals forces between Surfaces (Israelachvili chap. 11)
9. Forces between particles and surfaces: Adhesion (Israelachvili chap. 15)
10. Thermodynamic properties of self-assembly 1: Formation of aggregates (Israelachvili chap. 16.1-16.6)
11. Thermodynamic properties of self-assembly 2: Size distributions of self-assembled structures (Israelachvili chap. 16.7-16.10)
12. Aggregation of amphiphilic molecules into Miscelles (Israelachvili chap. 17)
13. Aggregation of amphiphilic molecules into Bilayers (Israelachvili chap. 17)
14. Aggregation of amphiphilic molecules into Vesicles (Israelachvili chap. 17)
15. Aggregation of amphiphilic molecules into biological membranes (Israelachvili chap. 17)
16. Dynamics of a polymer in a fixed network: contour length fluctuations (Doi, Chap. 6.4)
17. Rodlike polymers: rotational diffusion (Doi, Chap. 8.2)
18. Rodlike polymers: translational diffusion (Doi, Chap. 8.3)
19. Concentrated solutions of rigid rodlike polymers (Doi, Chap. 10.1-10.3)
20. Static distortions in a nematic single crystal: Magnetic field effects (deGennes, Chap. 3.2)
21. Static distortions in a nematic single crystal: Electric field effects in an insulating nematic (deGennes, Chap. 3.3)
22. Defects and textures in nematics (deGennes, Chap. 4)

23. Application of soft matter physics in cell biology (1): The actin filament
24. Application of soft matter physics in cell biology (2): Nucleic Acids
25. Application of soft matter physics in cell biology (3): Lipid Membranes
26. Application of soft matter physics in technology: Liquid crystal displays
27. Polyelectrolytes
28. Enveloped viruses
29. Vesicle fusion
30. Aqua porins
31. Intermediate filaments
32. Microtubuli