

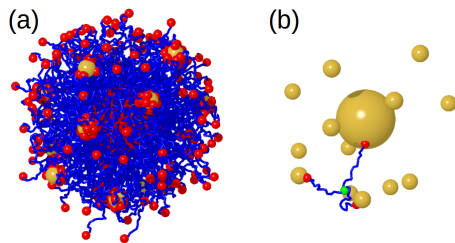


# Potential of Mean Force for Satellite Nanoparticles

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## Project

The planet-satellite nanostructures, formed by one big gold nanoparticle (NP) linked with some small NPs via star polymers, have recently attracted much interests due to their applications in plasmonic, catalysis, sensor, and biomedical disciplines. Construction of such nanostructures requires the adsorption of satellite NPs onto the grafted polymer shell on the big gold NP. Due to the heterogeneous monomer densities, the radial distribution of satellite NPs depends not only on the free-end monomer, but also on the total monomer densities. The goal of this Bachelor project consists in using simulations to calculate the mean force experienced by the satellite NP at fixed positions, and calculate the free-energy variation as a function of position. The result will be compared to the radial NP distributions from direct simulations.



**Abbildung 1** Snapshots of planet-satellite nanostructures (a) with and (b) without star polymers.

Required skills and main work:

- Familiar with statistical physics.
- Familiar with C language, gnuplot. Modifying, running the code, collecting, and analysing data.

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