

Can we learn colloidal liquids to nucleate using machine learning reaction coordinates?

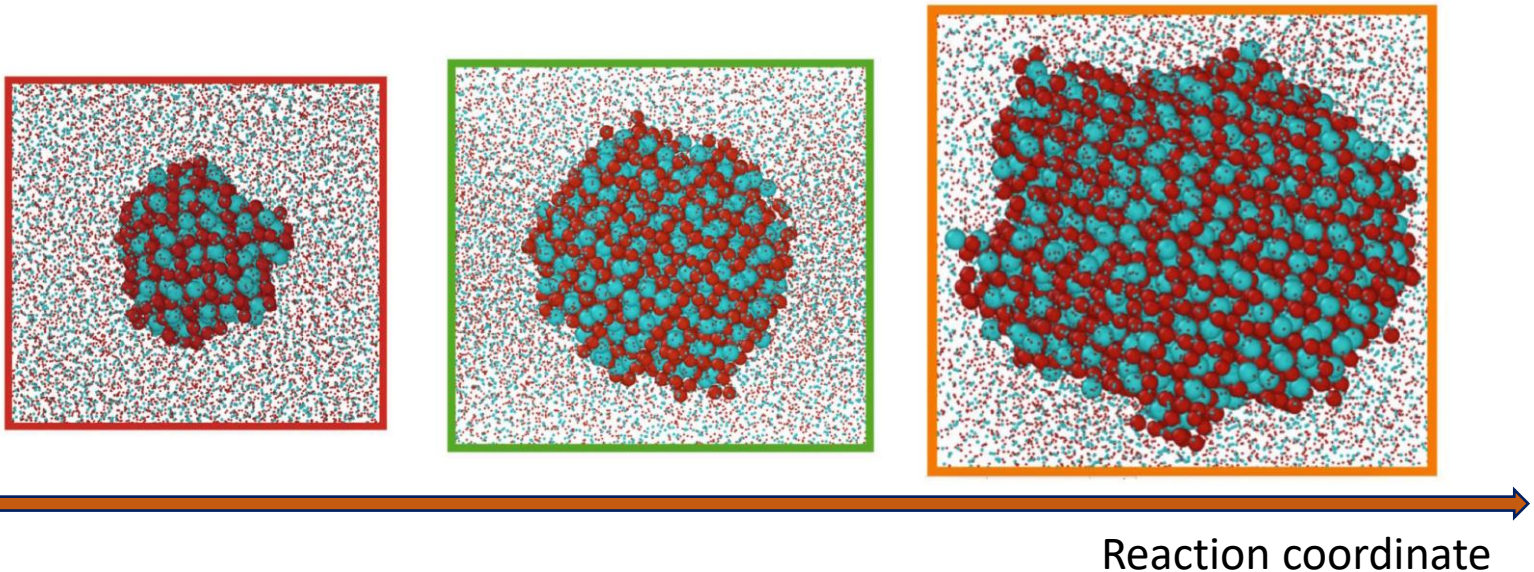
Research Question: Can we use machine learning to find the best reaction coordinate to learn colloidal particles to crystallize?

Skills and subjects to learn: Programming skills, Machine Learning techniques

Keywords: Monte Carlo simulations, Machine Learning

Recommended prior knowledge: Statistical Physics, Physical Chemistry

More info? M.Dijkstra@uu.nl



Machine Learning potentials for colloids and nanoparticles

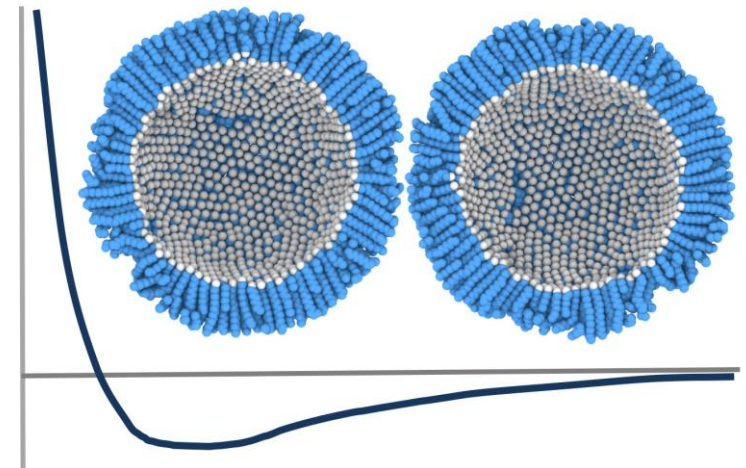
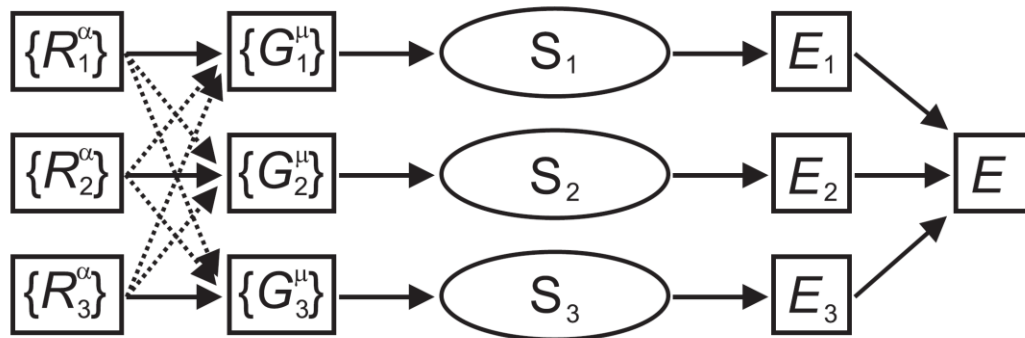
Research Question: Can we use machine learning potentials to speed up molecular simulations?

Skills and subjects to learn: Programming skills, Machine Learning techniques

Keywords: Monte Carlo simulations, Machine Learning

Recommended prior knowledge: Statistical Physics, Physical Chemistry

More info? M.Dijkstra@uu.nl



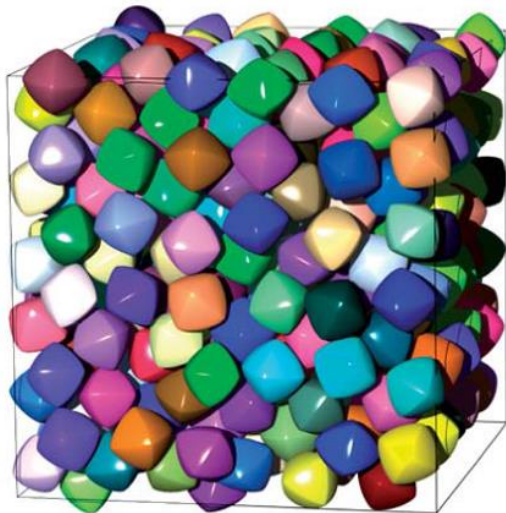
Inverse design of exotic colloidal plastic crystals, liquid crystals, quasicrystals

Research Question: Can we design the particle shape and interactions for exotic plastic crystals, liquid crystals, and quasicrystals?

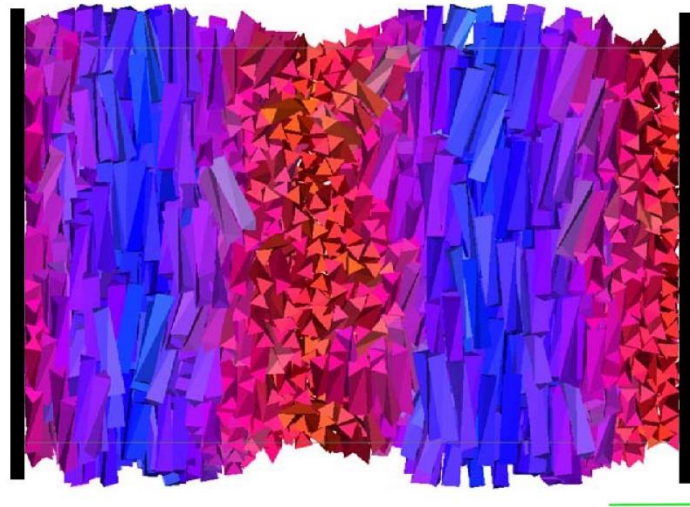
Skills and subjects to learn: Programming skills, Monte Carlo simulations, Statistical Physics

Keywords: Monte Carlo simulations, Machine Learning

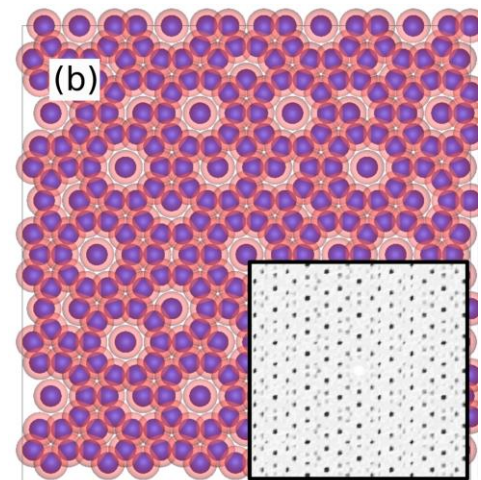
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Plastic Crystals



Liquid Crystals



Quasi Crystals

Classifying phases of matter and finding order parameters using Machine Learning

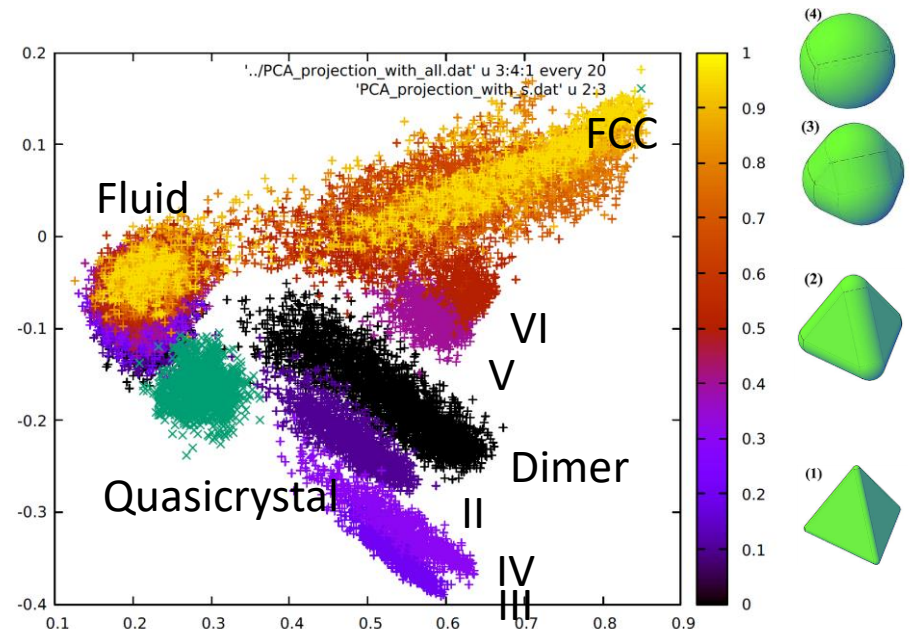
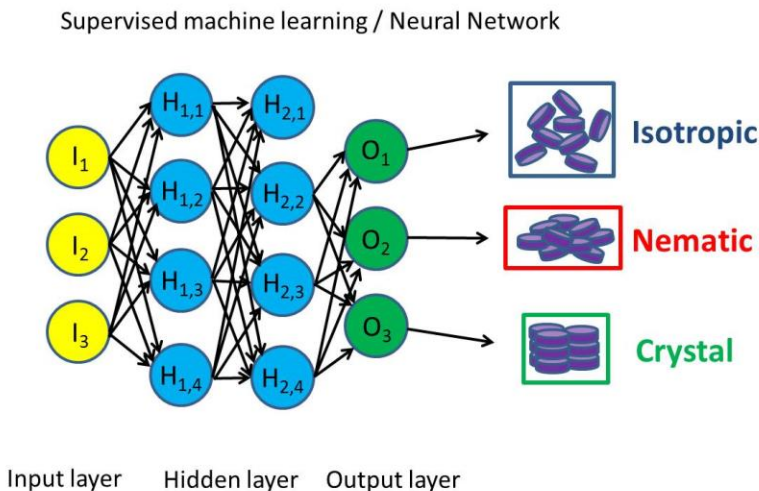
Research Question: Can we distinguish the different phases and find the corresponding order parameters using Machine Learning and computer simulations?

Skills and subjects to learn: Programming skills, Machine Learning techniques

Keywords: Monte Carlo simulations, Machine Learning

Recommended prior knowledge: Statistical Physics, Physical Chemistry

More info? M.Dijkstra@uu.nl



Let's twist again: why bananas bend and pears splay?

Research Question: Can we obtain insight in the microscopic origin of the macroscopic spatial modulations in nematic liquid crystals (LC) using theory and simulations?

Skills and subjects to learn: Programming and theoretical skills

Keywords: Monte Carlo simulations, Landau theory, Onsager theory

Recommended prior knowledge: Statistical Physics, Physical Chemistry

More info? M.Dijkstra@uu.nl

