FIG. 1: (Color online) Sketch of the angular dependence of the inter-particle potential $\phi(\theta)$

The parameters set in our model are compatible with colloidal particles of size $(200 - 400)nm$ in aqueous solution kept at a salt concentration sufficiently large to screen the electrostatic repulsion between the hydrophilic regions of any two particles [16].

The system is evolved using Molecular Dynamics simulations with a Langevin thermostat at constant room temperature, T, in a cubic box with periodic boundary conditions. Our system contains $N = 10^3$ particles kept at a constant volume fraction $\phi = 0.01$. We have chosen this concentration because it is comparable with those used in experimental studies on Janus Particles [16], so that our work could have a grounding experimental reference that our results could be compared to for $\theta_{\max} \simeq 90^\circ$. Each simulation runs for a minimum of 10^7 steps with a time step $\delta t = 0.001$. All quantities in this paper are expressed in standard dimensionless units.

RESULTS AND DISCUSSION

Our goal is to understand how particles condense into stable three-dimensional aggregates via the process of self-assembly, and how the specificity of the geometry of the interaction is reflected in the final structure. Figure 2 reports one of the main results of our simulations. It shows a diagram indicating the self-assembly lines separating the structures obtained for different values of $\theta_{\max}$ and ε, with a typical resolution of one degree for $\theta_{\max}$, and $0.1 k_{\mathrm{B}} T$ for the binding energy.

As expected, a rich variety of structures arises depending on the position of the dividing surface $\theta_{\max}$, and particles' binding energy, ε. Notice that, consistent with recent numerical