Dynamics of surfactant systems: New Ginzburg-Landau approach

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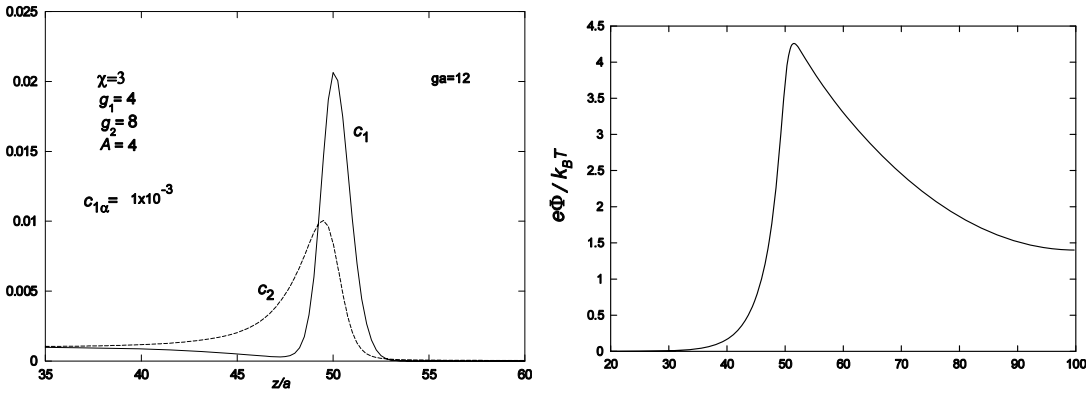
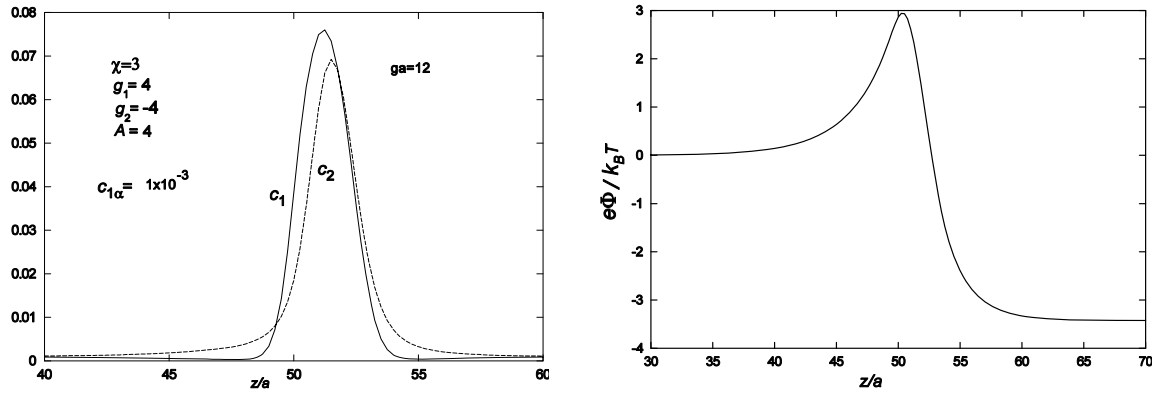
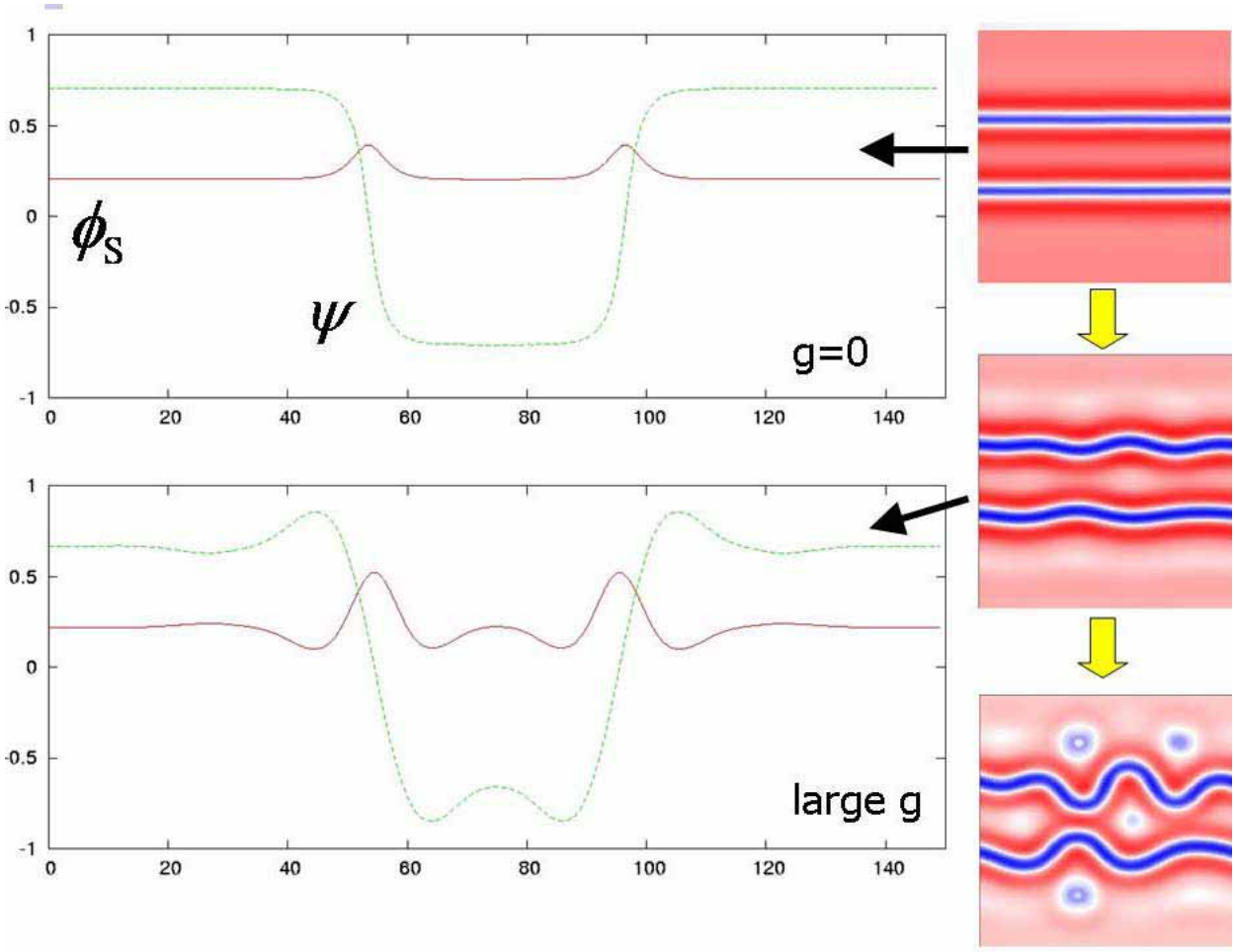
We recently proposed a Ginzburg-Landau theory of solvation in polar fluids [1].
As an example, we calculated the ion distributions around a liquid-liquid interface.
In this work, we show its generalization to include ionic surfactants.



The above figures show the ionic surfactant density c1 and the counterion c2 (left) and the electrc potential around a liquid-liquid interface (right). Here the counterions are more hydrophilic than the surfactant molecules. Those below are for thecase where the surfactants are hydrophilic but the counterions are hydrophobic.





The above figures show two-dimensional simulation of micelle formation after an instability of a liquid-liquid interface with increasing the surfactant density. We display the surfactant density (left) and the oil composition (right). The g represents the amphiphilic degree.

[1] A. Onuki, Phys. Rev.E 73(2006) 021506.