# What lies beyond the surface tension?

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It is well known that near a free liquid-gas interface the pair correlation function contains a long-wavelength, Goldstone mode divergence, due to the fact that the position of a free interface can be translated without energy cost.

In the 1970s and 1980s, after much initial debate between proponents of microscopic and mesoscopic approaches, everyone came to agree that at these long wavelengths the energy cost of fluctuations is controlled by the surface tension which of course resit any increase in the surface area –this is the famous capillary-wave picture of an interface behaving like a taut drum skin. However the debate as to what happens beyond the long wavelength limit, that is what, if anything, lies beyond the surface tension, has continued and indeed escalated in recent years.

We discuss these issues and present results of a new microscopic approach based on the idea that, in addition to a Goldstone mode, the correlation function must also exhibit a hierarchy of resonances at specific wavelengths, the consequences of which are discussed in depth.