# Oscillation Spectra of a Crystal $^4$He Facet and Its Destruction with Generating Crystallization Waves

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The wavelike processes of crystallization and melting or crystallization waves are well known to exist at the $^4$He crystal surface in the rough state. Much less is known about a possibility for existing any crystallization waves at the $^4$He crystal surface in the smooth well-faceted state below the roughening transition temperature. To meet the lack, we report here the spectrum of facet crystallization waves and its dependence upon the wavelength, perturbation amplitude, and the number of possible facet steps distributed somehow over the wavelength. The continuous generation of crystallization waves will result both in the destruction of a crystal faceting and in the transition to the rough state of a crystal facet. All the distinctive features of facet crystallization waves from conventional waves at the rough surface result from a known cusplike singularity in the angle dependence for the surface tension of smooth crystal facets, which displays itself as a divergent surface stiffness of the vicinal crystal surfaces tilted at small angles.