

## Dynamics of instable wave perturbations and lateral dendrite branching in an undercooled melt

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***The evolutional properties of the growth line of a free dendrite in an undercooled melt of a pure substance are studied. The conditions of morphological stability / instability of the phase boundary of crystallization are determined for the finite distance from the dendrite tip. To process the available experimental data on crystals growing from unicomponent undercooled melts we propose a growth parameter that contains the data about the kinetic properties of the phase boundary of crystallization and about the thermophysical properties of the melt. Approximation function for the dependence of the growth parameter of the melt undercooling are obtained for nickel and copper. Five variants of the growth line perturbations are studied with calculating the velocities of perturbation waves that propagate on spatially nonuniform background. Attention is paid to cases when stability / instability of the growth depends on the direction of the wave movement (to the tip or away from it). The limiting width of the background nonuniformity zone is calculated. The frequencies of exciting oscillations and the decrement of the excitation are determined. The numerical calculations enabled to compare the peculiarities of the dendrite growth for nickel and copper. An approximate analytical estimation for the growth velocity of the lateral branch base is given.***

*Keywords:* dendritic growth, interface evolution, morphological stability, side branch.

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