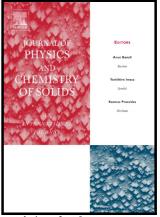
## Author's Accepted Manuscript

Dendritic growth with the six-fold symmetry: theoretical predictions and experimental verification

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## Dendritic growth with the six-fold symmetry: theoretical predictions and experimental verification

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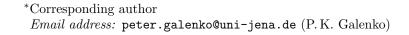
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## Abstract

A free dendrite growing in a pure substance is considered with the interfacial effect of anisotropy and convective flow. A stable mode of dendritic growth with the six-fold crystal symmetry is studied using the solvability theory. We demonstrate that the obtained selection criterion for a stable mode of dendritic growth is a function of surface energy stiffness, arbitrary values of Péclet numbers and convective flow intensity. To predict the dendrite tip velocity V and its tip radius R a model of dendrite growth with the six-fold symmetry is formulated. We show that the model equations can be reduced to the growth kinetics with the low Péclet numbers, which exhibit the explicit relationships "tip velocity - undercooling". The model predictions are compared with experimental data on ice dendrites grown from pure undercooled water on board of the International Space Station (under microgravitational conditions,  $\mu g$ ) and on the Ground (under terrestrial conditions, 1g).

Keywords: Growth models; Dendrites; Convection; Solvability theory



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