Abstract Submitted
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Crystallization of Solids in the Presence of Anisotropic Growth Rates and Gaussian Nucleation Rates[1] KIMBERLY LOKOVIC, California State University Long Beach, ANDREAS BILL, California State University Long Beach, CA 90840, RALF BERGMANN, Institute for Applied Beam Technology (BIAS), University of Bremen, 28359 — The grain size distribution allows characterizing quantitatively the microstructure of an amorphous solid at different stages of crystallization. We review the theory developed recently for the grain size distribution (GSD) [1] and present two extensions of the model. In the first generalization, we replace the isotropic growth rate by an anisotropic rate that leads to the formation of ellipsoidal grains. Different anisotropic growth mechanisms are considered. We obtain an analytical expression for the GSD when the growth rate leads to a change of volume leaving the shape of grains invariant [2]. In the second generalization, we study how the GSD is affected by replacing the Dirac-type source term of nuclei by a more physical Gaussian-type source. We use that model to analyze the GSD at early stages of crystallization.

[1] A.V.Teran, R.B.Bergmann and A.Bill, Phys. Rev. B 81, 075319 (2010).
[2] K.S.Lokovic, R.B.Bergmann and A.Bill, Mater. Res. Soc. Symp. Proc. 1245, A16-07 (2010).

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