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## *Applications of Gibbs-Laguerre tessellations to the modeling of polycrystalline materials*

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In materials research, three-dimensional (3D) grain structure of polycrystalline metals is investigated. An adequate probabilistic model for the microstructure of polycrystalline materials is a random tessellation. We will focus on the mostly used Laguerre tessellation model based on generators, which form a locally finite point set. Considering the set of generators as a Gibbs point process we obtain the Gibbs-Laguerre tessellation. The choice of the energy function of the underlying Gibbs point process reflects the desired geometrical characteristics of grains. For the statistical analysis of an experimental data we can simulate from a given model using MCMC. The estimation of the parametric model is reasonable only in some range of parameters. We present a method of statistical reconstruction of Gibbs-Laguerre tessellations given real data of a polycrystal.