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Abstract

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Exponential decorrelation of subcritical repulsive Gibbs particle processes

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We consider a stationary Gibbs particle process with deterministically bounded particles on Euclidean space defined in terms of a non-negative pair potential and an activity parameter. For small activities we show that the correlation functions factorize in an exponentially decreasing way. Our main technical tool is a disagreement coupling of two Gibbs processes with a dominating Poisson particle process. This coupling is based on a spatial (non-dynamical) thinning construction of finite Gibbs processes. We will provide a general setting for such a thinning which applies also to non-repulsive Gibbs processes. Our results can be used to establish uniqueness of Gibbs distributions as well as central limit theorems.