

## Critical exponents for the homotopy of Fortuin-Kasteleyn clusters on a torus

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We study the critical behavior of statistical lattice models in 2d using the homotopy of their Fortuin-Kasteleyn (FK) cluster. A FK cluster on a torus is said to be of type  $\{a, b\}$ ,  $a, b \in \mathbb{Z}$ , if it is possible to draw a curve belonging to the cluster that winds  $a$  times around the first cycle of the torus as it winds  $-b$  times around the second. Even though the  $Q$ -Potts models make sense only for  $Q$  integers, they can be included into a family of models parametrized by  $\beta = \sqrt{Q}$  for which the FK clusters can be defined for any real  $\beta \in (0, 2]$ . For this family, we study the probability  $\pi(\{a, b\})$  of a given type of clusters as a function of the torus modular parameter  $\tau = \tau_r + i\tau_i$ . We compute the asymptotic behavior of some of these probabilities as the torus becomes infinitely thin. Exponents describing these behaviors are defined and related to weights  $h_{r,s}$  of the extended Kac table for  $r, s$  integers, but also half-integers. Numerical simulations are also presented. Joint work with Alexi Morin-Duchesne.