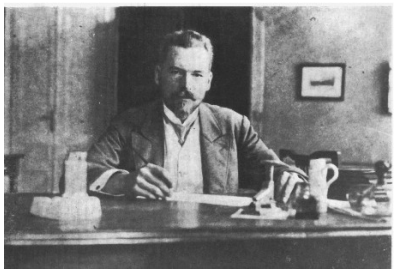

Contribution ID: **2** Type: **Regular talk**

Changeover phenomenon in randomly colored Potts models

Tuesday, 17 September 2024 13:00 (20 minutes)

The celebrated "standard" q-state (color) Potts model, where the ferromagnetic interaction is between nearest-neighboring spins on the square lattice, is known to change its temperature-driven phase transition, from continuous to discontinuous, at some critical integer $q_c = 4$ [1,2,3]. Renormalization group theory suggests that this result should hold for other lattices or interaction content, provided that the interaction is local. There are, however, counterexamples of models with a local interaction and $q_c < 4$ [4,5].

We [6] present a new and general hybrid Potts scheme (HPS) where q_c can be manipulated, by introducing inhomogeneity to the system. More precisely, spins are chosen at random with probabilities p and $1-p$, to be colored in q_0 and q colors, respectively, where $q_0 \leq q_c < q$. We show that, when HPS is applied to the standard model, for any allowed setup of spin numbers q_0, q there is a concentration p^* where the transition type of the model is changed.
Independently, a mean-field-like interaction HPS is studied. It is shown that p^* exists for this HPS. Exact expressions for the second order critical line in concentration-temperature parameter space, together with some other related critical properties, are derived.

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