

# Phase transition of two-dimensional generalized XY model

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We study the two-dimensional generalized XY model that depends on an integer  $q$  by the Monte Carlo method. This model was recently proposed by Romano and Zagrebnov. We find a single Kosterlitz-Thouless (KT) transition for all values of  $q$ , in contrast with the previous speculation that there may be two transitions, one a regular KT transition and another a first-order transition at a higher temperature. We show the universality of the KT transitions by comparing the universal finite-size scaling behaviors at different values of  $q$  without assuming a specific universal form in terms of the KT transition temperature  $T_{\text{KT}}$ .

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