

Abstract Submitted  
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**First-order transition in 2D classical XY-model** SNEHADRI OTA, Institute of Physics, Bhubaneswar, SMITA OTA, Institute of Mathematics and Applications, Bhubaneswar — We have carried out micro-canonical Monte Carlo simulations of the extended 2D XY-model in  $30 \times 30$  lattice using periodic boundary conditions.<sup>1-4</sup> The energy distributions of the spins have been obtained for the value of the parameter  $q=55$ .<sup>3,4</sup> The energy distribution of the spins in the lattice shows features that can be associated with spin wave and vortex excitations.<sup>5</sup> The results agree with the first-order transition observed in canonical Monte Carlo simulations, due to vortex nucleation.<sup>3</sup> References: [1] M.Creutz, Phys.Rev.Lett. **50** (1983) 1411 [2] S Ota and S B Ota, Phys.Lett.A **367** (2007) 35 [3] E.Domany, M.Schick, R.H.Swendsen, Phys.Rev.Lett. **52** (1984) 1535 [4] J.E.van Himer-gen, Phys.Rev.Lett. **53** (1984) 5; Phys.Rev.B **29** (1984) 6387 [5] J B Kogut, Rev.Mod.Phys. **51** (1979) 659

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