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Super-scaling of Percolation on Rectangular Domains HIROSHI WATANABE, Department of Complex, Systems Science, Graduate School of Information Science, Nagoya University, YUKAWA SATOSHI, NOBUYASU ITO, Department of Applied Physics, School of Engineering, The University of Tokyo, CHIN-KUN HU, Institute of Physics, Academia Sinica — For percolation on a $(RL) \times L$ two-dimensional rectangular domains with width L and aspect ratio R , we propose that the existence probability of percolating cluster $E_p(L, \epsilon, R)$ as a function of L , R , and deviation from the critical point ϵ can be expressed as $F(\epsilon L^{y_t} R^a)$, where $y_t \equiv 1/\nu$ is the thermal scaling power, a is a new exponent, and F is a scaling function. We use Monte Carlo simulation of bond percolation on square lattices to test our proposal and find that it is well satisfied with $a = 0.14(1)$ for $R > 2$. We also propose super-scaling for other critical quantities.

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