

Flat-band ferromagnetism as a Pauli-correlated percolation problem

M. Maksymenko^a, A. Honecker^{b,c}, R. Moessner^d, J. Richter^e and O. Derzhko^a

^a*Institute for Condensed Matter Physics, National Academy of Sciences of Ukraine, 1 Svientsitskii Street, 79011 Lviv, Ukraine,
E-mail: m.maksymenko@icmp.lviv.ua*

^b*Institut für Theoretische Physik, Georg-August-Universität Göttingen, 37077 Göttingen, Germany*

^c*Fakultät für Mathematik und Informatik, Georg-August-Universität Göttingen, 37073 Göttingen, Germany*

^d*Max-Planck-Institut für Physik Komplexer Systeme, Nöthnitzer Straße 38, 01187 Dresden, Germany*

^e*Institut für Theoretische Physik, Universität Magdeburg, P.O. Box 4120, 39016 Magdeburg, Germany*

We investigate location and nature of the para-ferro transition of interacting electrons in dispersionless bands using the example of the Hubbard model on the Tasaki lattice. This case can be analyzed as a geometric site-percolation problem where different configurations appear with non-trivial weights. We provide a complete exact solution for the 1D case and develop a numerical algorithm for the 2D case. In 2D the paramagnetic phase persists beyond the uncorrelated percolation point, and the grand-canonical transition is via a first-order jump to an *unsaturated* ferromagnetic phase.