

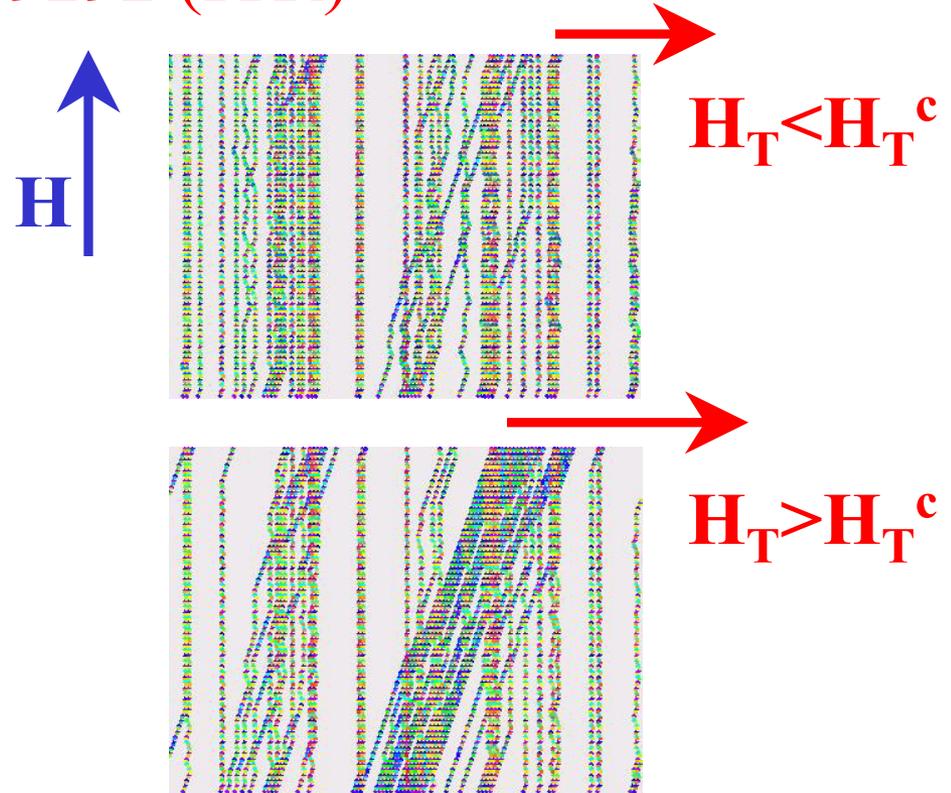
Magnetic flux lines & correlated disorder

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We are using algorithms from combinatorial optimization to study numerically the physics of magnetic flux lines in disordered superconductors.

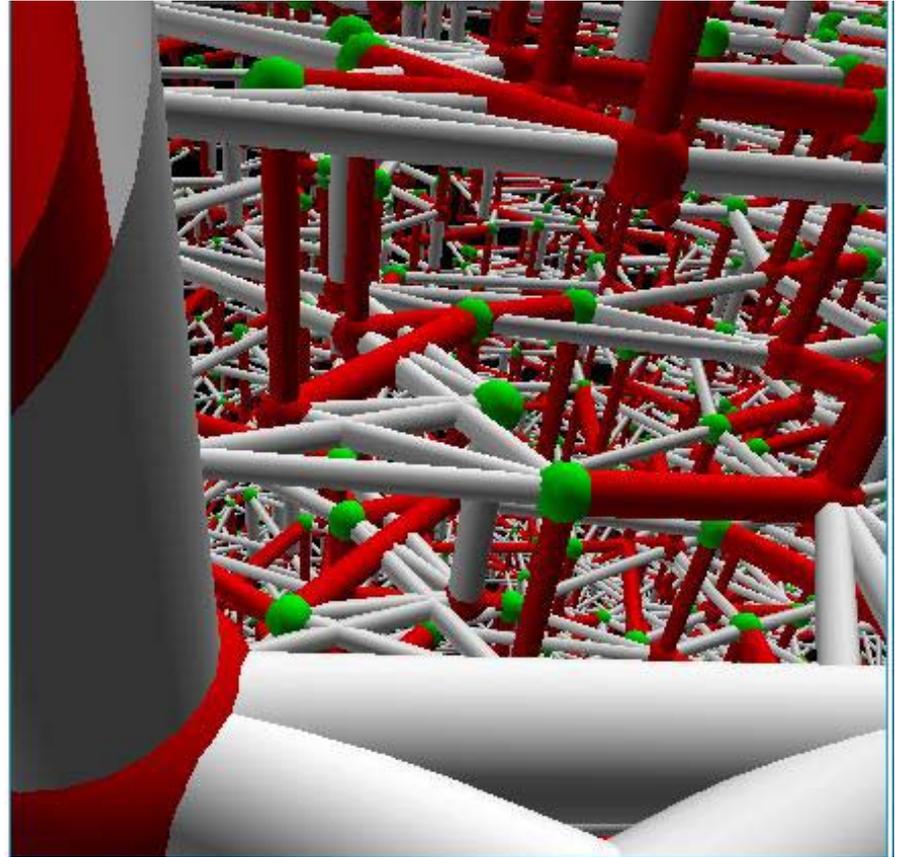
We are investigating the interplay of interactions and the geometry of disorder in determining the ground states in both two and three dimensions.



Flux lines in 2D pinned by columnar and point disorder and tilted by a transverse field H_T . No macroscopic tilt is observed below a critical H_T (transverse Meissner effect).

Disordered classical and quantum systems

A well-known mapping between the statistical mechanics of $d+1$ -dimensional classical systems and d -dimensional quantum systems allows us to use the same algorithms to study the phases of flux lines in dirty superconductors and electrons in disordered solids



Three dimensional configuration of flux lines (red bonds) in a disordered superconductor, corresponding to world lines of quantum particles in 2D.