Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Dynamical phyllotaxis: transition modes and Sine-Gorden-like solitons YUANXI WANG, Penn State University, CRISTIANO NISOLI, T- Division, CNLS Los Alamos National Laboratory, VINCENT CRESPI, Penn State University — Repulsive particles constrained to a cylindrical surface generate a rich set of static spiral patterns known as phyllotaxis. The ground states and quasi-static transitions of phyllotaxis has been well understood based on the conventional hypothesis that particles always form a cylindrical lattice. We investigate inhomogeneous transition modes which break this helical symmetry to connect monojugate and multijugate patterns. Furthermore, traveling Sine-Gordon-like solitons in dynamical phyllotaxis are observed in numerical simulations and explained using a modified Frenkel-Kontorova model. We show that kinks propagate spirally along selected parastichies and carry an intrinsic dipole. Applications in different areas of physics are discussed.

Yuanxi Wang
Penn State University

Date submitted: 11 Nov 2011 Electronic form version 1.4