Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Soft quasicrystals - Why are they stable?[1] RON LIFSHITZ, HAIM DIAMANT, Tel Aviv University — In the last two years we have witnessed the exciting experimental discovery of soft matter with nontrivial quasiperiodic long-range order—a new form of matter termed a *soft quasicrystal*. Two groups have independently discovered such order in soft matter: The first in a system of dendrimer liquid crystals [1]; and the second in a system of ABC star-shaped polymers [2]. These newly discovered soft quasicrystals not only provide exciting platforms for the fundamental study of both quasicrystals and of soft matter, but also hold the promise for new applications based on self-assembled nanomaterials with unique physical properties that take advantage of the quasiperiodicity, such as complete and isotropic photonic band-gap materials [3]. Here we provide a concise review of the emerging field of soft quasicrystals [4], and invoke an old theory [5] suggesting that the existence of two natural length-scales, along with 3-body interactions, may constitute the underlying source of their stability.
[1] Zeng *et al.*, Nature **428** (2004) 157.
[2] Takano *et al.*, J. Polym. Sci. Polym. Phys.**43** (2005) 2427.
[3] Zoorob *et al.*, Nature **404** (2000) 740.
[4] Lifshitz & Diamant, preprint (cond-mat/0611115).
[5] Lifshitz & Petrich, Phys. Rev. Lett. **79** (1997) 1261.

[1]Supported by the Israel Science Foundation, grant number 684/06.

Ron Lifshitz
Tel Aviv University

Date submitted: 17 Nov 2006 Electronic form version 1.4