DYNAMIC INSTABILITIES IN BIOLOGICAL MEMBRANES

F. Campelo[1], A. Hernández-Machado[1]

(1) Departament d'Estructura i Constituents de la Matèria, Facultat de Física, Universitat de Barcelona, Diagonal 647, E-08028 Barcelona, Spain. (campelo@ecm.ub.es, aurora@ecm.ub.es)

Dynamic instabilities in membranes have been recently studied experimentally, such as pearling [1], budding and tubulation [2]. In these experiments shape instabilities are induced by the insertion of a certain concentration (locally or globally) of an amphiphilic polymer (which mimicks the proteins within the biomembranes) in the outer leaflet of the bilayer.
A phase-field model that takes into account the bending energy of fluid vesicles has been derived recently by the authors [3]. An extension of this model to deal with complex dynamic problems as those mentioned above has been done [4]. There, both the equation for the shape dynamics, and for the polymer diffusion in the bilayer are coupled and numerically solved. Results are well in agreement with those found in the experiments but Tsafrir *et al.* (see figure below, for a comparison of the experimental and theoretical shapes).

[1] I. Tsafrir et al. Phys. Rev. Lett. **86**, 1138 (2001)

[2] I. Tsafrir et al. Phys. Rev. Lett. **91**, 138102 (2003)

[3] F. Campelo and A. Hernández-Machado. Eur. Phys. J. E **20** (1), 37-45 (2006)

[4] F. Campelo and A. Hernández-Machado. *submitted to Phys. Rev. Lett.*