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Spontaneous appearance of fractal and non-fractal seacoasts as a consequence of self-damped erosion

B. Sapoval (1,2), **A. Baldassarri** (1,3) and A. Gabrielli (4)

(1) PMC, CNRS Ecole Polytechnique, Palaiseau, France, (2) CMLA, Ecole Normale Supeieure, Cachan, France, (3) Dipartimento di Fisica, Universitea' "La Sapienza", Roma, Italy, (4) ISC, CNR, Roma, Italy

Erosion of rocky coasts spontaneously creates irregular seashores. But the geometrical irregularity, in turn, damps the sea waves, decreasing the average wave amplitude. There may then exist a mutual self-stabilization of the wave amplitude together with the irregular morphology of the coast. A simple model of such stabilization is studied. It may leads, through a complex dynamics of the earth-sea interface, to the appearance of a stationary fractal seacoast with a dimension close to 4/3. Fractal geometry here plays the role of a morphological attractor directly related to percolation geometry. Under specific conditions, the same mechanism lead to non-fractal geometry that still exhibit a statistical signature of the underlying critical dynamics.