

Colloquium ICMAT-UCM

FRACTALIZATION AND QUANTIZATION IN DISPERSIVE SYSTEMS

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ABSTRACT: The evolution, through spatially periodic linear dispersion, of rough initial data produces fractal, non-differentiable profiles at irrational times and, for asymptotically polynomial dispersion relations, quantized structures at rational times. Such phenomena have been observed in dispersive wave models, optics, and quantum mechanics, and lead to intriguing connections with exponential sums arising in number theory. Ramifications and recent progress on the analysis, numerics, and extensions to nonlinear wave models, both integrable and non-integrable, will be presented. Time permitting, recent related results for the Fermi-Pasta-Ulam problem will also be discussed.