BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA

INSTITUTO DE FÍSICA

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“The FPU problem: from chaos to thermalization”

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Resumen: In physics, the Fermi–Pasta–Ulam–Tsingou (FPUT) problem or formerly the Fermi–Pasta–Ulam problem was the apparent paradox in chaos theory that many complicated enough physical systems exhibited almost exactly periodic behavior – called Fermi–Pasta–Ulam–Tsingou recurrence (or Fermi–Pasta–Ulam recurrence) – instead of the expected ergodic behavior. This came as a surprise, as Enrico Fermi, certainly, expected the system to thermalize in a fairly short time. That is, it was expected for all vibrational modes to eventually appear with equal strength, as per the equipartition theorem, or, more generally, the ergodic hypothesis. Yet here was a system that appeared to evade the ergodic hypothesis. Although the recurrence is easily observed, it eventually became apparent that over much, much longer time periods, the system does eventually thermalize. Multiple competing theories have been proposed to explain the behavior of the system, and it remains a topic of active research.

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