

# Statistical Physics, Complexity, and Us

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## Introduction

Physics intends to understand our environment. The classical approach, the approach which is usually taught at school, and the one which most people may be familiar with, is to model physical systems by means of some equations and, given certain initial conditions, find the trajectory. Cars moving in a highway, balls falling from a given height, or masses attached to springs, are typical problems that may be solved this way, and may even represent the image of Physics many people has by the end of high-school years.

But, what if the system has so many particles that finding individual trajectories is impractical or even useless? What if correlations between particles turn the problem into an unsolvable set of equations? And if initial conditions are not exactly known, and small changes in them yield completely different results?

These issues lead us to the rich universe of statistical physics, nonlinear physics, chaos, and complexity. Concepts that have enlarged the fields of interest of Physics, pushing it into the realm of interdisciplinary research. In this talk, we will explore some of the consequences of this, and what Physics has to tell us about rabbits, coast lines, weather, and coffee. What Statistical Physics has to do with us.

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