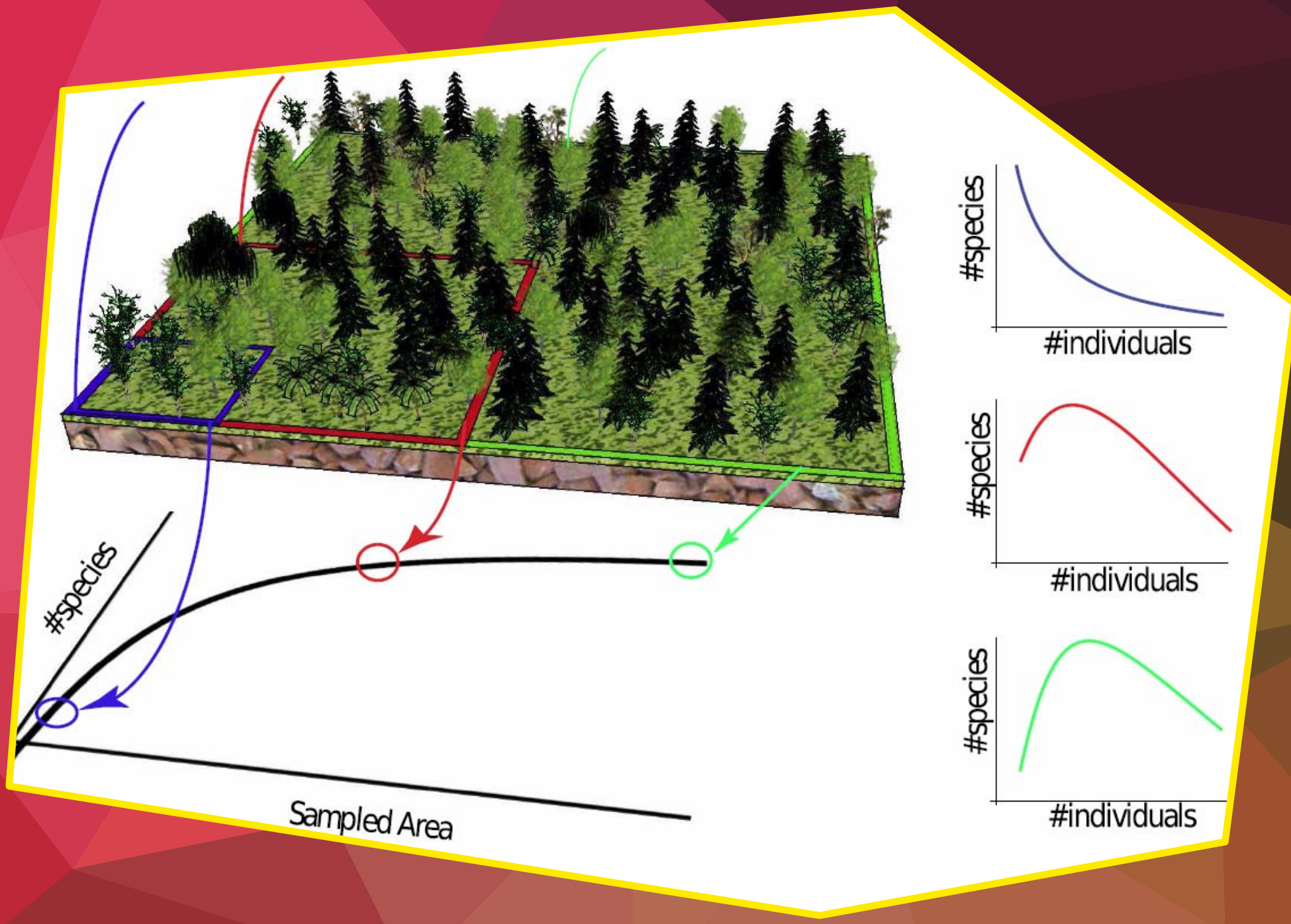
PHYSICS**COLLOQUIA**2020



Living systems are characterized by the recurrent emergence of patterns/regularities independent of their biological/physiological details.
In ecological communities species interact forming networks with typical topological structures.
Power-law distributions and long-range correlations are pervasive and can be found both at the level of single organisms and at the community level.
The most challenging goal in ecology is to grasp how general trends and behaviors emerge in spite of such complexity.
Forests represent one of the most complex systems with a high degree of structural and functional diversity:
in the tropics, there often are hundreds of coexisting plant species with different habitats and thousands of consumers,
each of them with interspecific relationships with plant species.
This leads to a multitude of interconnected food webs and complex fluxes of matter and energy.
We demonstrate an astounding simplicity underlying the apparent bewildering complexity of forests.
Our starting point is based on optimization/variational principles
and scaling analysis from statistical physics for understanding
and making predictions that are in accord with empirical data.

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OPTIMALITY AND SCALING IN LIVING MATTER

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UNIVERSITÀ DEGLI STUDI DI MILANO
DOTTORATO DI RICERCA IN FISICA
ASTROFISICA E FISICA APPLICATA

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