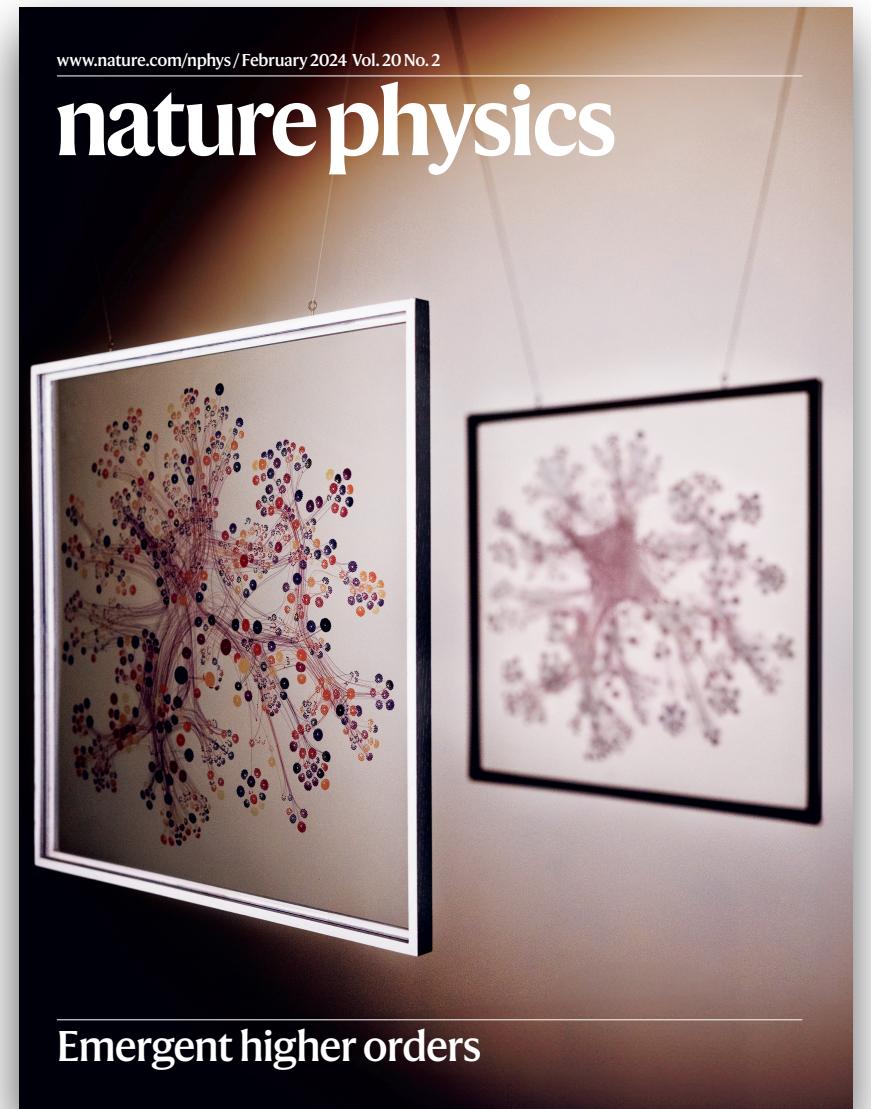


Main takeaways

- ▷ The rapid decrease of the singular values of adjacency matrices (i.e. low effective rank) offers a *justification* for low-dimensional mathematical models beyond mathematical and/or conceptual convenience.
- ▷ A *large proportion* of real networks can be considered as having a low effective rank.
- ▷ The *higher-order interactions* observed in some systems could be a *byproduct* of a low-dimensional representation used to analyze them.



nature physics

Article <https://doi.org/10.1038/s41567-023-02303-0>

The low-rank hypothesis of complex systems

Received: 18 October 2022 | Accepted: 24 October 2023

Vincent Thibeault^{1,2}✉, Antoine Allard^{1,2} & Patrick Desrosiers^{1,2,3}✉



Vincent Thibeault
Université Laval



Patrick Desrosiers
Université Laval
CERVO Brain research center

Outline

1. Are simple models enough to study complex systems/networks?

2. “Simple” ways to encode structural complexity

(a) latent metric space

(b) stub types

