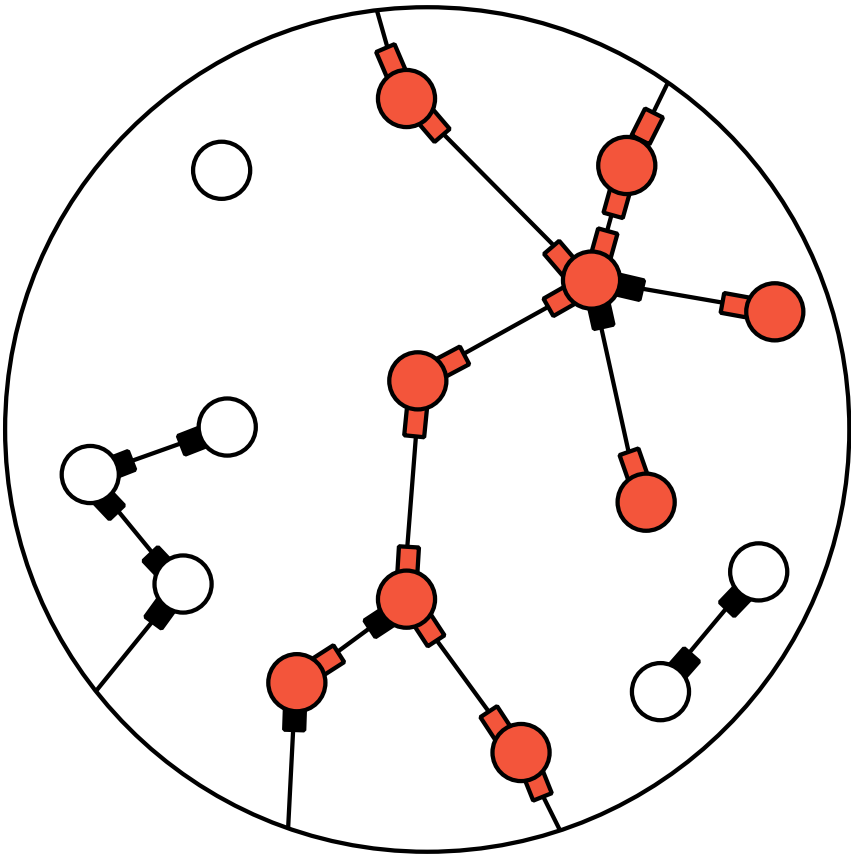
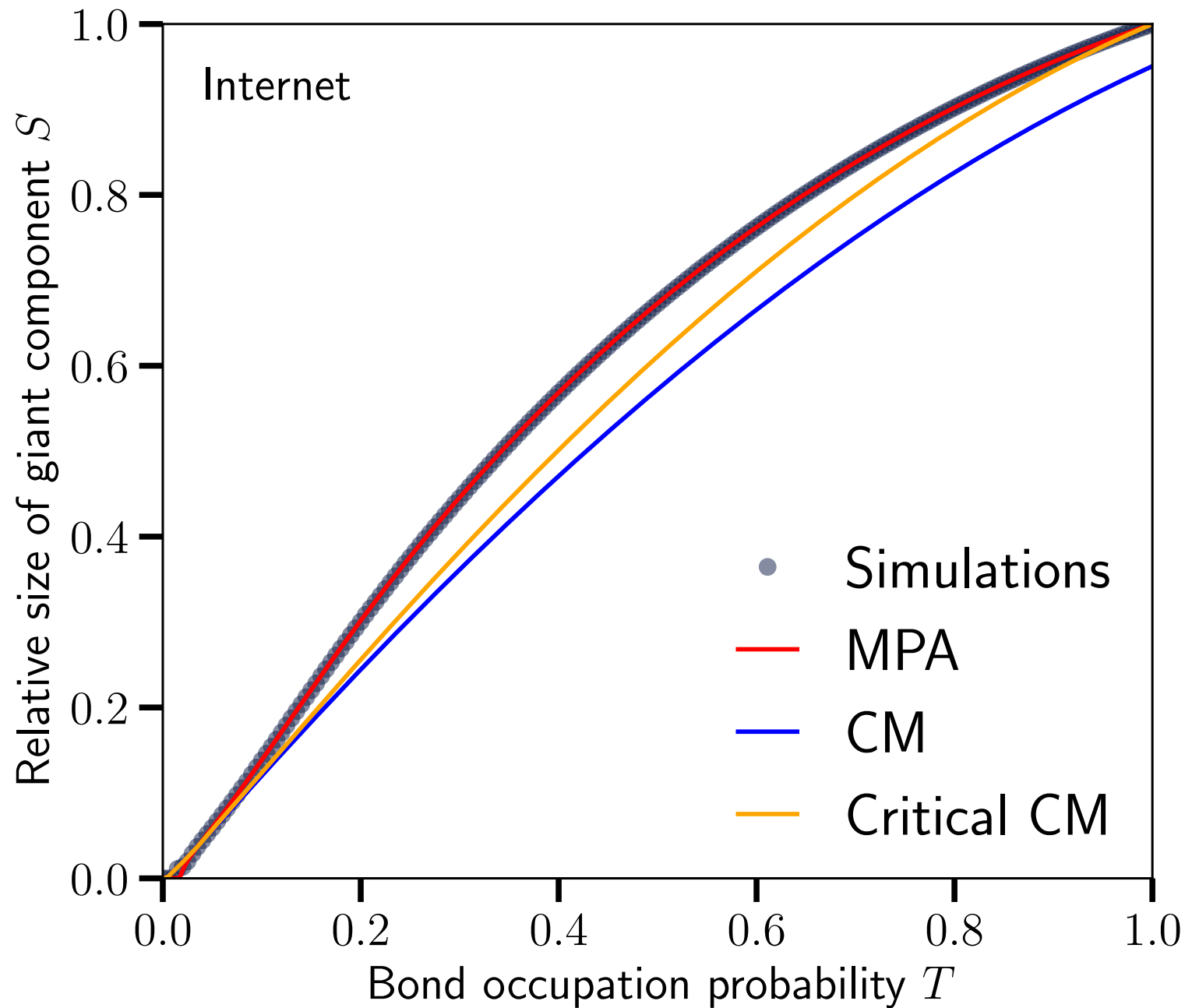


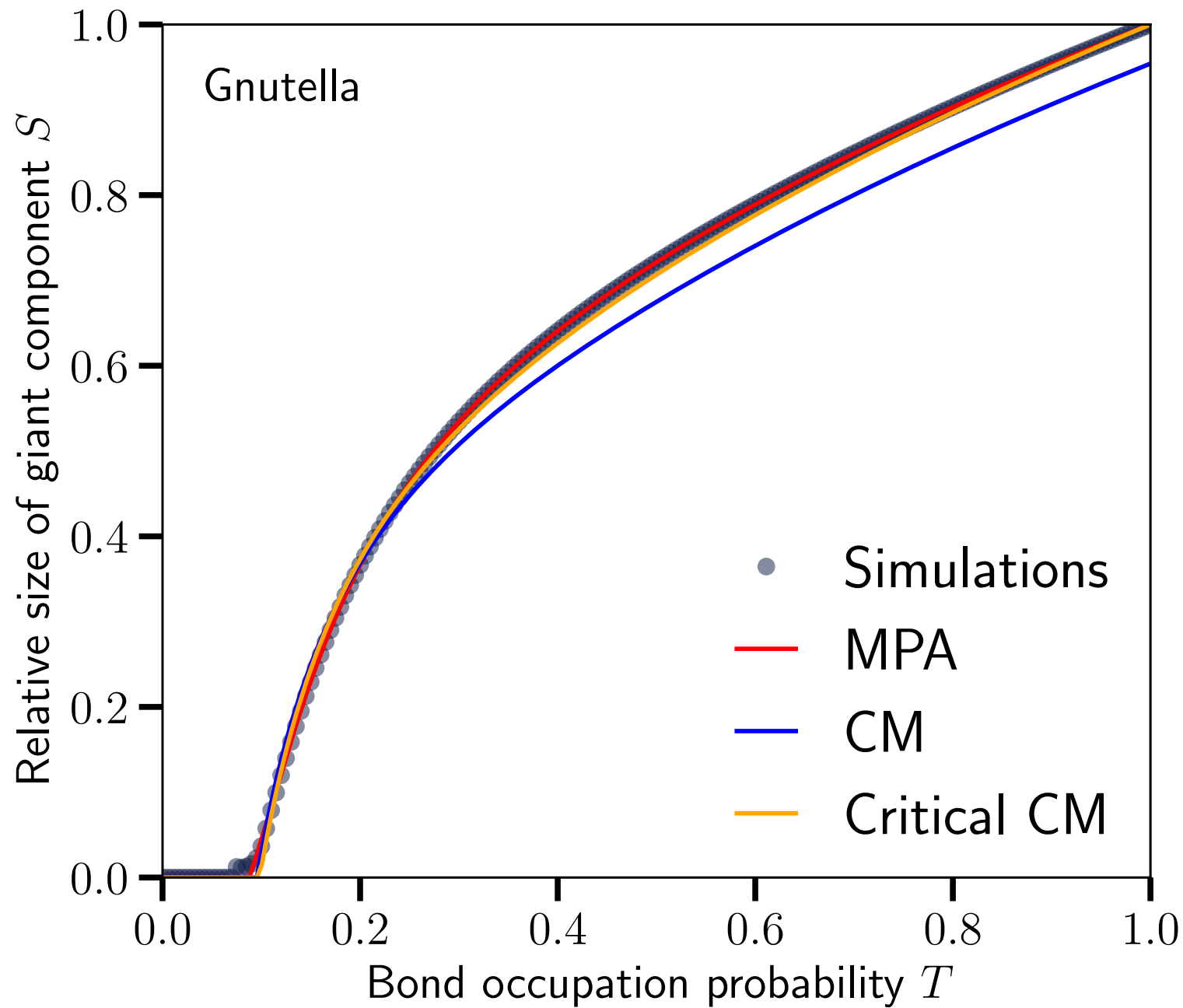
2

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Macrosopic level: Connectivity







Preprocessing: Identify links that lead to the largest connected component and tag them as red; all remaining stubs are tagged as black.

Stub matching scheme

- ▷ One type of nodes
- ▷ Two types of stubs (red, black)
- ▷ Rules:
 1. Allowed links: red-red, red-black
 2. Black stubs connect to any other stubs, but only towards nodes with excess red degree 0.
 3. Red stubs connect to any other stubs, but only towards nodes with excess red degree at least 1.

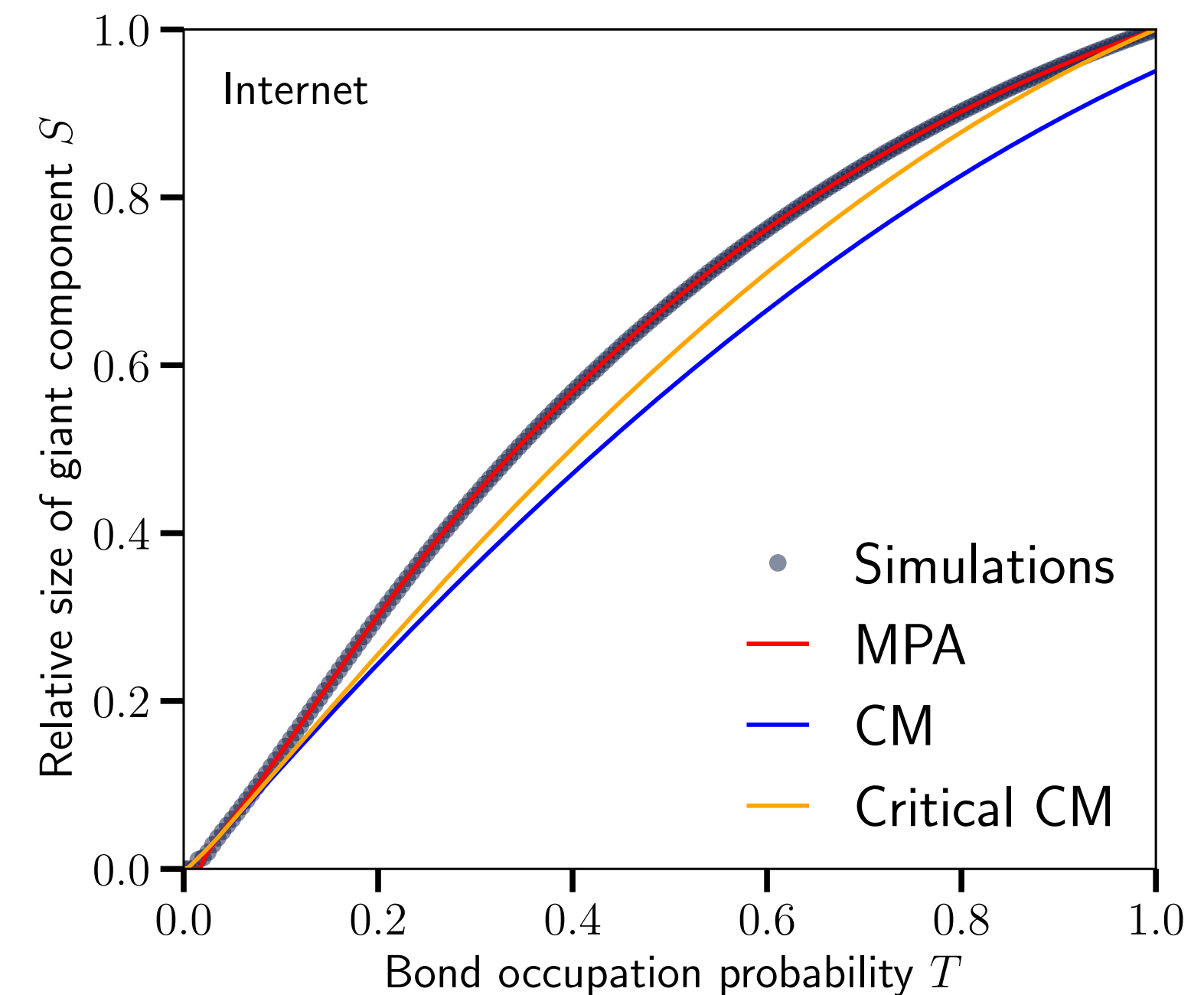
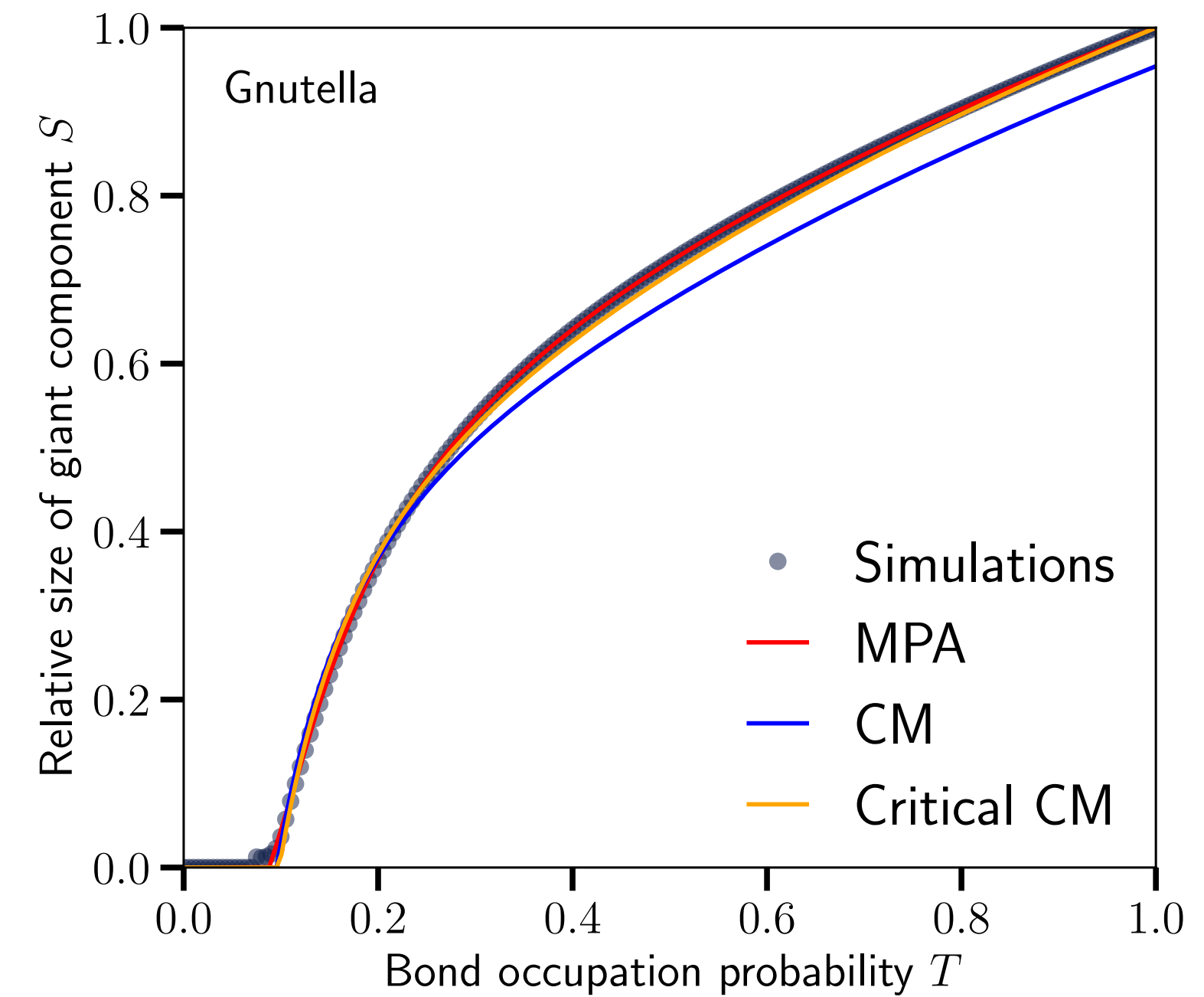
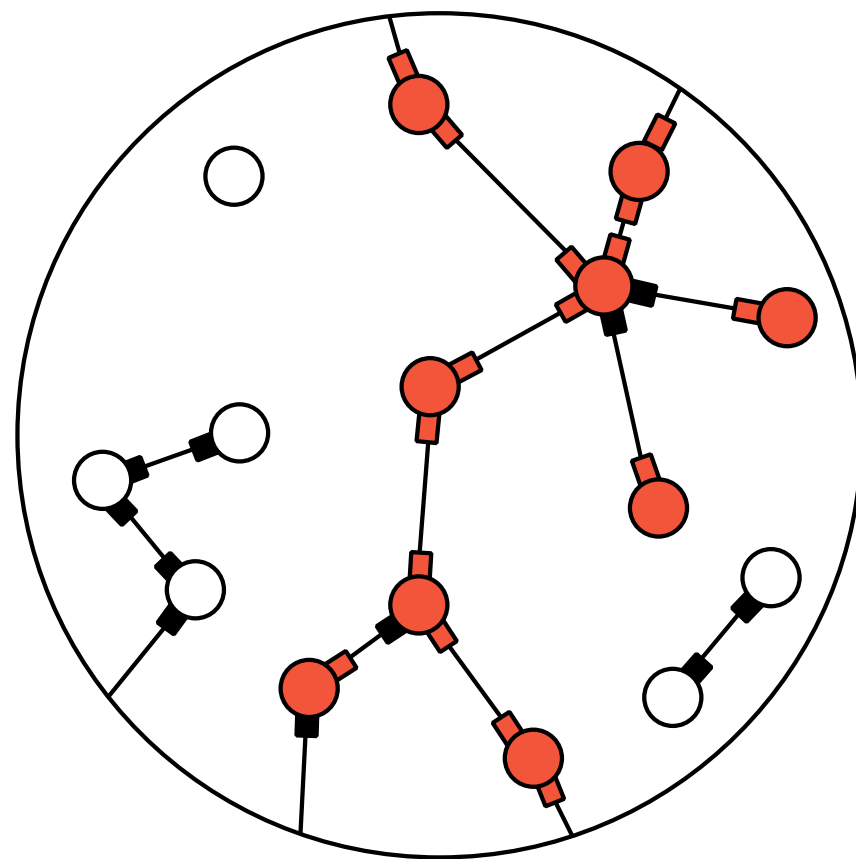
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Main takeaways

- ▷ **Local connection rules** can enforce strict **global topological features**.
- ▷ These rules can be leveraged to design
 - new mathematical frameworks (ex.: ODEs, PGFs)
 - new sampling algorithms (ex.: edge swapping)

Multi-scale structure and topological anomaly detection via a new network statistic: The onion decomposition

Laurent Hébert-Dufresne¹, Joshua A. Grochow¹ & Antoine Allard²

Sci. Rep. 6, 31708 (2016)

Percolation and the Effective Structure of Complex Networks

Antoine Allard^{1,2} and Laurent Hébert-Dufresne^{3,1}

Phys. Rev. X 9, 011023 (2019)

Modeling critical connectivity constraints in random and empirical networks

Laurent Hébert-Dufresne,^{1,2,3} Márton Pósfai,⁴ and Antoine Allard^{3,5,1}

arXiv:2307.03559



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