Stuttgarter Physikalisches ONLINE Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
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Login data will be announced by e-mail and on the colloquium webpage: www.physik.uni-stuttgart.de/aktuelles/kolloquium

Dienstag, 23. Juni 2020 **16.15 Uhr**

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Phase transitions and spreading dynamics in neural networks

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Abstract

Biological as well as artificial networks show amazing information processing properties. We use approaches from statistical physics and information theory to uncover their operation principles and derive optimal design for a given task. A popular hypothesis is that neural networks profit from operating close to a continuous phase transition, because at a phase transitions, several computational properties are maximized. We show that maximizing these properties is advantageous for some tasks – but not for others. We then show how tuning networks away or towards a phase transition enables to adapt them to requirements. Thereby we shed light on the operation of biological neural networks, and inform the design of artificial ones. – In a second part of the talk, we turn to the spread of SARS-CoV-2 in Germany. We quantify how governmental policies and the concurrent behavioral changes led to a transition from exponential growth to decline of novel case numbers. We conclude with discussing potential scenarios of the SARS-CoV-2 spread for the months to come.

Cramer et al., Nature Communications, in press
Dehing et al., Science, in press
Wilting & Priesemann, Nature Communications, 2018
Zierenberg, Witling & Priesemann, PRX 2018