

DIESE WOCHE

PHYSIKALISCHES KOLLOQUIUM

des Fachbereichs Physik
der Johann Wolfgang Goethe-Universität Frankfurt

Mittwoch, den 29.04.2015, 16 Uhr c.t.
Großer Hörsaal, Raum _0.111,
Max-von-Laue-Str. 1

Dr. Raoul-Martin Memmesheimer

Department for Neuroinformatics,
Donders Center, Radboud University Nijmegen,
Netherlands

"Learning precisely timed spikes"

Neurons (nerve cells) communicate with short electrical pulses, called spikes. This discontinuous interaction at discrete time points makes the dynamics of neuronal networks very different from those of conventional dynamical systems and a challenging subject of theoretical physics research.

Neurobiological experiments have revealed precisely timed patterns of spikes in several neuronal systems, raising the possibility that precise spiking is used by the brain to encode and transmit information. I will present recent research showing how neurons may learn to generate temporally precise patterns of spikes. The derived learning rules can be used to compute the memory capacity of neurons and its scaling. Further, they propose novel ways to analyze information content of spike data and to reconstruct underlying anatomical connectivity. Finally, they can be generalized to an arbitrary neuronal network architecture that includes feedback and recurrent connections.

Die Dozenten der Physik

Kolloquium