JÜLICH
FORSCHUNGSZENTRUM

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Helmholtz Young Investigator Group: Theory of multi-scale neuronal network

„Rebuilding a brain in a computer is unlikely to explain its function – what is required in addition is a reduction to its essential constituents. Theory is one way that helps us achieve this."

The organization of the cerebral cortex extends over a wide range of spatial scales, from the specificity of single synapses to hierarchically organized networks of entire cortical areas. Identifying the mechanisms that shape the activity on these scales is the basis to interpret signals measured in experiments and to form hypothesis about brain function. This requires abstractions and reductions. We develop such theoretical descriptions that span several scales and exhibit the mechanisms shaping the activity in cortical networks. We apply, adapt, and extend methods from theoretical physics and mathematics, such as static and dynamic mean-field theory, Fokker-Planck equations, stochastic differential equations and the path integral formalism.

What is/has been the greatest challenge as head of a young investigators group:
Getting the team of excellent scientists from different areas to jointly work in the same direction.

Start of funding period:	**01.01.2014**
End of funding period:	**31.12.2018**
Budget:	**250.000 Euro per year**
Staff:	**1 PostDoc, 2 PhD students**
University affiliation:	**RWTH University Aachen**
Cooperations:	**Okinawa Institute of Science and Technology** **University of Freiburg** **University of Frankfurt**
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