



## **Prof. Dr. Grisha Volovik**

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### **General principles of emergent physics with application to the cosmological constant problem**

The phenomenon of emergent physical laws has become the paradigm of modern physics. We discuss how topology in momentum space leads to emergence of gravity and main ingredients of Standard Models of particle physics: left-handed and right-handed fermions and gauge fields.

Appearance of these emergent quantum fields in the low-energy corner of the quantum vacuum is accompanied by emergence of general physical laws such as relativistic invariance, gauge invariance, etc. This allows us to study different problems related to quantum vacuum, in particular problems of vacuum energy and cosmological constant.



**8. Februar 2008, 14:00 Uhr**

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