

# C. Wetterich

## Curriculum Vitae

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Date and Place of Birth: 12. April 1952, Freiburg, Germany

Nationality: German

Present Position: Professor (C4)

Background: Studies in Physics at Université Paris VII (1972/73),  
Universität Köln (1973/75), Universität Freiburg (1975/78)

Diploma (1978)  
Dissertation (Ph.D.) (1979 ; summa cum laude)  
Habilitation (1983) (Univ. Freiburg)

Employed by the University of Freiburg (1977-81)  
Fellow at CERN (Geneva) (1981-1983)  
Universität Bern (1983-1985)  
Heisenberg Stipendium (at CERN) (1985)  
DESY (Hamburg) (1985-1992), permanent staff  
Univ. Heidelberg (since 1992), chair of theoretical physics  
Dean, Faculty of Physics and Astronomy 1999/2000  
Member Scientific Council DESY 1996 – 1998  
Member Selection Committee for A. v. Humboldt Awards  
since 1998  
Member Heidelberger Akademie der Wissenschaften since  
2006  
External member of Max Planck Institute for Nuclear Physics  
Heidelberg since 2006

Awards: Goedecke prize 1979  
Max-Planck research prize 2005

## **Research interests and achievements**

### *Cosmology:*

First proposal of a dynamical Dark Energy (quintessence) [1].

Proposal of Dark Energy-Dark Matter coupling [2].

Investigation of time variation of fundamental constants in quintessence models (1987), recent work: [3].

Analysis of role of Early Dark Energy for CMB and structure formation, e.g. [4,5].

Inflation as transition from higher dimensions to effective four dimensions (1983, with Q. Shafi).

### *Particle Physics:*

Neutrino masses and oscillations, proposal of triplet mechanism as alternative to seesaw [6].

Explanation of three generations of quarks and leptons by higher dimensional chirality index (1983) – this is widely used in superstring theories.

Spinor gravity as proposal for quantum gravity [7].

### *Methods:*

Modern form of functional renormalization (effective average action) (1993), see [8].

### *Phase transitions:*

Proposal of crossover replacing electroweak phase transitions (1983 with M. Reuter).

Investigation of transition to quark gluon plasma, e.g. [9].

### *Non-Equilibrium Quantum Field Theory:*

Proposal of prethermalization [10].

## Selected publications

- [1] C. Wetterich: Cosmology and the fate of dilatation symmetry, Nucl. Phys. **B302** (1988) 668
- [2] C. Wetterich: The cosmon model for an asymptotically vanishing time dependent cosmological ‘constant’, Astron. Astrophys. **301** (1995) 321-328
- [3] C. Wetterich: Crossover quintessence and cosmological history of fundamental ‘constants’, hep-ph/0301261, Phys. Lett. **B561** (2003) 10-16
- [4] R. Caldwell, M. Doran, C. Mueller, G. Schaefer, C. Wetterich: Early Quintessence in Light of WMAP, astro-ph/0302505, Astrophys. J. **591** (2003) L75-L78
- [5] M. Bartelmann, M. Doran, C. Wetterich: Nonlinear structure formation in cosmologies with early dark energy , astro-ph/0507257
- [6] G. Lazarides, Q. Shafi, C. Wetterich: Proton lifetime and fermion masses in an SO(10) model, Nucl. Phys. **B181** (1981) 287
- [7] A. Hebecker, C. Wetterich: Spinor gravity, hep-th/0307109, Phys. Lett. **B574** (2003) 269-275
- [8] J. Berges, N. Tetradis, C. Wetterich : Non-perturbative renormalization flow in quantum field theory and statistical physics, hep-ph/0005122, Phys. Rep. **363** (2002)
- [9] P. Braun-Munzinger, J. Stachel, C. Wetterich: Chemical freeze-out and the QCD phase transition temperature, nucl-th/0311005, Phys. Lett. **B596** (2004) 61
- [10] J. Berges, Sz. Borsányi, C. Wetterich: Prethermalization, hep-ph/0403234, Phys. Rev. Lett. **93** (2004) 142002