

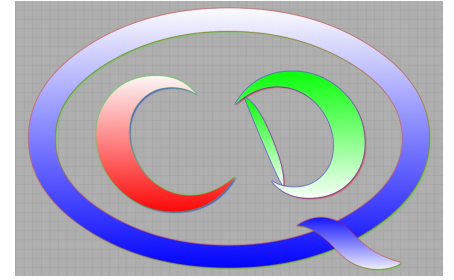
# Why do we need the CRC 110 – A personal perspective

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*Oct. 02, 2014*

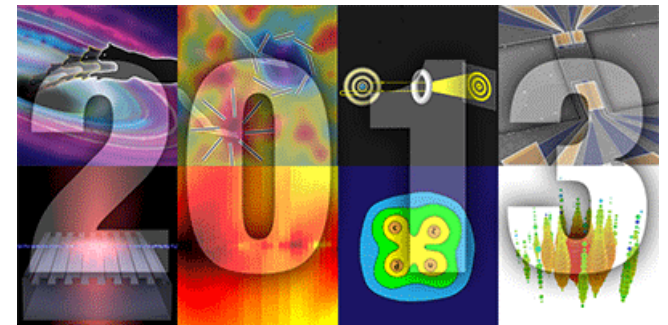
# CRC 110



- Symmetries and Emergence of Structure in QCD  
cf. talk by Prof. Meißner
  - Difficult subject investigating how the matter of the world interacts
  - A. Symmetries: 5 projects
  - B. Emergence of Structure: 8 projects
- Most projects deal with various aspects of hadron physics
  - Hadron interactions
  - Hadron spectroscopy and decays
  - Use and test of symmetries (complementary to nuclear physics)
- Extensive use of model-independent techniques
  - Effective field theory
  - Lattice simulations

# Hadron physics in China (Exp)

- Continuous support from the government
  - From 1989, BES, BES-II @BEPC  
(Beijing Electron-Positron Collider at IHEP)
  - From 2008, BES-III @BEPC-II  
(approved officially in 2003)
  - Hadron spectroscopy, charm physics,  
charmonium physics:  
e.g., the observation of  $Z_c(3900)$  and  
other candidates for exotic hadrons

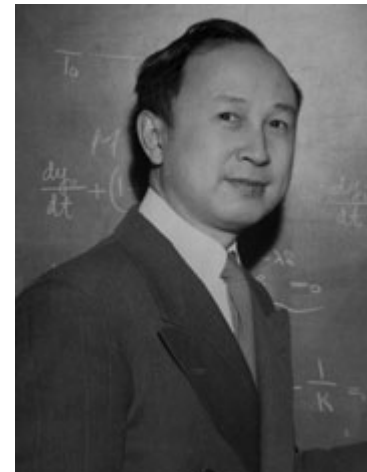


# Hadron physics in China (Theory)

- Hadron theory groups
  - [IHEP](#) (Chinese partner of the CRC 110)
  - [Peking University](#) (Chinese partner of the CRC 110)
  - Shandong University
  - Central China Normal University
  - Lanzhou University & Institute of Modern Physics
  - ...
- Mostly phenomenological studies using models
- Lack of modern effective field theory expertise
- Too few lattice QCD practitioners (<10 professors)

# Why does China need this

- Long-standing problems
  - Lack of up-to-date knowledge and modern perspective
  - Lack of creativity
  - Hsue-Shen Tsien (Qian Xuesen, 1911-2009)'s Question:
    - “Why do our universities always fail to nurture outstanding talents?”
- The situation is changing



# Why does China need this

- Solutions
  - Recruiting top-level scientists from abroad
    - 100 Talents Program of CAS (from 1994)  
>2200 scientists have been recruited, the core power of CAS
    - 1000 Talents Plan (from 2008)  
>2000 scientists were brought back to China, working in universities, institutes and companies
  - **International collaborations** with top institutions, such as in **this CRC**

# Programs for young researchers

- 100 Talents Program of CAS
  - Requires at least 4 years overseas experience
- 1000 Talents Project
  - Aiming at recruiting overseas professors in top institutions
  - Subproject for Young Researchers (from 2010)
  - Requires at least 5 years overseas experience
- Many other projects for talents by local government

# Personal experience

## Graduate

- PhD 2007



Institute of High Energy Physics

- Supervised by **Prof. Peng-Nian Shen**
- Thesis: *Heavy Quarkonium  $\pi\pi$  Transitions and New Hadronic States*
- Collaborated with **Prof. Bing-Song Zou** (Co-spokesperson of CRC 110)
- A quark-model / phenomenological group:  
hadron spectroscopy, charm / charmoium physics,  
basic knowledge of effective field theory



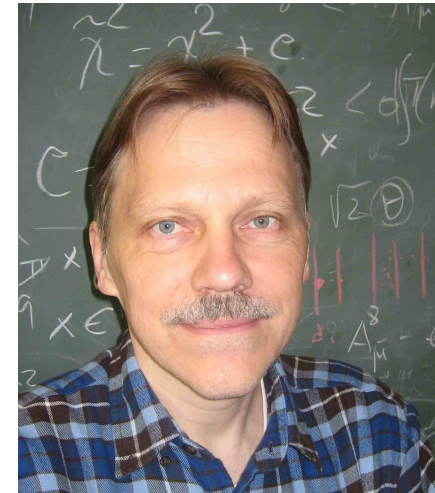
# Personal experience

## Postdoctoral fellow

- In Prof. Meißner's group

10.2007 – 09.2010 Jülich (VIQCD)

10.2010 – Bonn (CRC110 from 07.2012)



- World leading research group in the field of effective field theory
- Learned various aspects of effective field theory in collaboration/discussion with Profs. Meißner, Hanhart, Krewald, Kubis and Drs. Haidenbauer, Nogga, Wirzba, ...

# Benefits and outcome

## Research

- 07.2012 –  
Project leader of Projects B.3 and A.5 in CRC 110
- Knowledge of charm and charmonium physics ([from IHEP](#))  
+ effective field theory ([here](#))
- More than 30 papers in peer-reviewed journals in collaboration with Prof. Meißner
- Established collaboration with the Valencia group

# Benefits and outcome

## Career perspectives

- Offered an associate professorship by the Institute of Theoretical Physics, CAS at the end of 2013
- From the next funding period, will be a PI in ITP
- Currently applying for the 1000 Young Talents Project



# A.5

## Quark mass dependence of heavy-light systems

- **Postdoc: Dr. Wei Wang**
  - 2009, PhD, IHEP
  - Productive: published more than 10 papers in Bonn
  - **Back to China in Aug. 2014**, tenure track, Shanghai Jiaotong University
  - Applying for the 1000 Young Talents Project
- **Collaborations**
  - The Chinese PI, **Prof. Ping Wang**, visited Bonn in 2013 for two weeks, 1 co-authored paper
  - 2 papers published in collaboration with the associated member Dr. Liuming Liu

# B.3

## Hadronic molecules with heavy meson loops

- Postdoc: [Dr. Qian Wang](#)
  - 2012, PhD, IHEP
  - Productive: published 8 papers, one of them (PRL) was cited for >70 times
- Collaborations
  - Chinese PI, [Prof. Q. Zhao](#), visited Jülich & Bonn every year
  - 7 papers coauthored by Chinese and German PIs were published

## B.3

# Hadronic molecules with heavy meson loops

- Student exchange
  - [Martin Cleven](#) (Jülich) visited IHEP for 3 months, now a postdoc in IHEP
  - [Xiao-Gang Wu](#) (IHEP) visited Jülich for 1 year

# Chinese postdocs and students

- Important for young researchers to join a world-leading group / know a different culture

- **Postdocs**

[Qian Wang](#) (B3, 2012 IHEP), [Wei Wang](#) (A5, 2009 IHEP)

[Bingnan Lü](#) (2013 ITP)

[Deliang Yao](#) (2013 PKU), [Ning Li](#) (2013 PKU)

[Liuming Liu](#) (associated member, 2010 William and Mary College)

[Chu-Wen Xiao](#) (2014 Valencia University)

- **Students**

Jülich: [Xianwei Kang](#), [Dechuan Du](#)

Bonn: [Zhi Yang](#), [Menglin Du](#)

# Frequent student exchange

- From Chinese institutions

Xiaogang Wu (IHEP): 1 year in Jülich (2013)

Ning Li, Hang Liu (PKU): 6 months in Bonn (2013)

Jun Shi (IHEP): currently in Jülich for 3 months

Jian Liang (IHEP), Zhanlin Wang (PKU): arrived in Bonn **today**, 3 months

- From German institutions

Martin Cleven (Jülich), Ina Lorenz (Bonn): 3 months in IHEP (2013)

Max Jansen (Bonn): 9 months in IHEP (2013)

Christian Jost (Bonn): currently in PKU for 3 months



# Exchange of PIs and postdocs

- Visitors from Chinese institutions
  - PIs:
    - Qiang Zhao (many times), Ping Wang (July 2013, Bonn), Chuan Liu (July 2013, Bonn), Ying Chen (July 2013, Bonn), Yu Jia (IHEP) will visit TUM in Nov. 2014
  - Postdocs:
    - Chunsheng An (Feb.-May 2013, Bonn)
    - Yun-Hua Chen (ITP) will visit Bonn in Nov. 2014
    - Jinniu Hu (PKU) will visit Jülich in Dec. 2014
- Visitors from German institutions
  - Longer-terms/often:
    - Ulf-G. Meißner, FKG
  - Shorter visits:
    - C. Urbach, H.-W. Hammer, B. Knippschild, N. Brambilla, A. Vairo, N. Kaiser, ...



Many more collaborations will happen!

Thank you for your attention!