

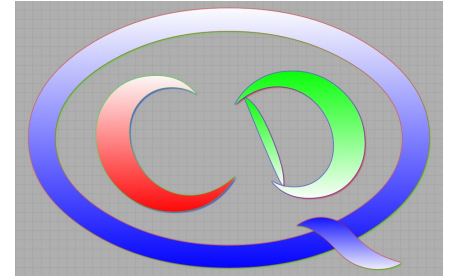
Why do we need the CRC 110 – A personal perspective

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CRC 110



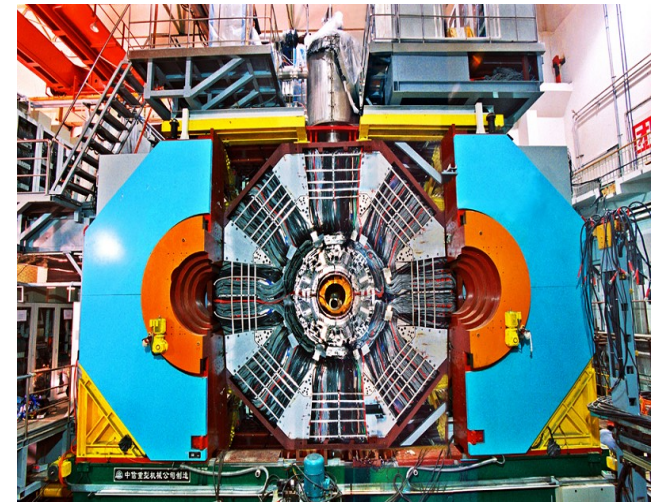
- **Symmetries and Emergence of Structure in QCD**

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
- **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)
 - From 2008, BES-III @BEPC-II (approved officially in 2003)
 - Hadron spectroscopy, charm physics, charmonium physics



中国科学院高能物理研究所
Institute of High Energy Physics Chinese Academy of Sciences

Hadron physics in China (Theory)

- Hadron theory groups
 - IHEP
 - Peking University
 - 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)'s Question:



“Why do our universities always fail to nurture outstanding talents?”

- Solutions

- Recruiting top-level scientists from abroad
 - 100 Talents Program of CAS (from 1994)
 - >1000 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

Personal experience

Undergraduate

- BS 2002

Shandong University



- One year of Particle Physics course by Prof. Zuo-tang Liang (Dr. rer. nat., Freie Universität Berlin, an expert on the proton spin problem) and Prof. Qu-bing Xie (an expert on heavy ion collisions)

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*
- In collaboration with Profs. Huan-Ching Chiang and Bing-Song Zou (Co-spokesperson of CRC 110)
- A quark model group:
hadron spectroscopy, charm / charmoium physics,
basic knowledge of effective field theory

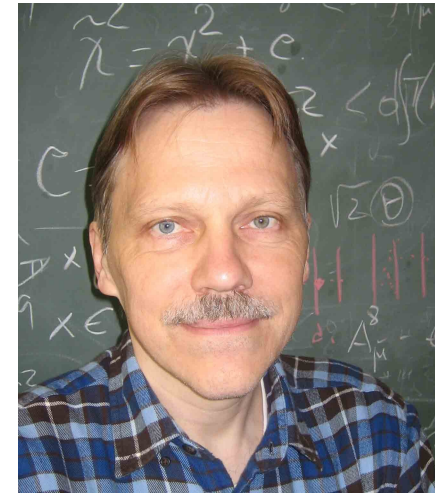
Personal experience

Postdoctoral fellow

- In Prof. Meißner's group

10.2007 – 09.2010 Jülich

10.2010 – Bonn



- 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 the CRC 110
- Knowledge of charm and charmonium physics (from IHEP) + effective field theory (here)
- More than 25 papers in peer-reviewed journals in collaboration with Prof. Meißner
- Starting collaboration with Valencia group

Benefits and outcome

Career perspectives

- 100 Talents Program of CAS (from 1994)
 - Requires at least 4 years overseas experience
- 1000 Talents Plan (from 2008)
 - Aiming at recruiting overseas professors in top institutions
 - Subproject for Young Researchers (from 2010)
 - Requires at least 5 years overseas experience

A.5

Quark mass dependence of heavy-light systems

- Collaboration

- 1 paper published in Phys.Rev.D with associated member Dr. Liuming Liu
- The Chinese PI, Prof. Ping Wang, will visit Bonn for two weeks in July 2013

- Postdoc

- Dr. Wei Wang (PhD, 2009, IHEP)

B.3

Hadronic molecules with heavy meson loops

- **Collaboration**
 - 1 paper coauthored by Chinese and German PIs was published in *Phy.Rev.D*, 1 accepted by *Phys.Lett. B*
 - 2 coauthored papers were submitted
- **Postdoc**
 - Dr. Qian Wang (PhD, 2012, IHEP)
- **Student exchange**
 - Martin Cleven (Jülich) is visiting IHEP (3 months)
 - Xiao-Gang Wu (IHEP) is visiting Jülich (1 year)

Chinese postdocs and students

- **Postdocs**

Qian Wang (B3, 2012 IHEP), Wei Wang (A5, 2009 IHEP), Bingnan Lü (2013 ITP)

Liuming Liu (associated member, 2010 William-Mary Coll.)

Coming: Deliang Yao (2013, PKU), Ning Li (2013 PKU)

- **Students**

Xianwei Kang, Dechuan Du (coming), Zhi Yang (coming)

- **Exchanged students**

Xiaogang Wu (IHEP), Ning Li (PKU, coming), Hang Liu (PKU, coming)

Martin Cleven, Max Jansen and Ina Lorenz from Jülich/Bonn are visiting IHEP

- **Visitors**

Qiang Zhao (Feb. 2012, Jülich), Chunsheng An (Feb.-May 2013, Bonn), Ping Wang (July 2013, Bonn), Chuan Liu (July 2013, Bonn), Ying Chen (July 2013, Bonn), ...



Many more collaborations will happen!

Thank you for your attention!