

Annual Report

<b>Funding Programme:</b>	Helmholtz Young Investigators Groups
<b>Project ID No.:</b>	VH-NG-502
<b>Project Title:</b>	Supersymmetry at the Terascale
<b>Group Leader:</b>	Isabell-A. Melzer-Pellmann
<b>Helmholtz Centre:</b>	DESY
<b>Participating University:</b>	Hamburg University
<b>Report Period (=Calendar Year):</b>	01/2011-12/2011

**1) Group Structure**

*Please report briefly on the structure and personnel development of your group.*

Group members:

2 Postdocs paid by the YIG: Dirk Krücker, Altan Cakir  
 2 DESY Fellows working with the YIG: Dean Horton, Elias Ron  
 2 PhD students paid by DESY: Matthias Stein, Francesco Costanza  
 2 PhD students paid by Hamburg University (with money for YIG): Hannes Schettler, Niklas Pietsch

**2) Network**

*Please describe how you / your research group are integrated within the Helmholtz Centre and the partner university (e.g. as member of committees).*

D. Krücker is responsible for the organization of the CMS Center (daily shifts as well as visitor guidance).

**3) Satisfaction**

*How satisfied are you with the general working conditions provided by the Helmholtz Centre / partner university? Is there anything that meets your criticism?*

I am very satisfied with the working conditions provided by DESY. The partnership with the Hamburg University is also fine.

**4) Scientific Progress / Milestones**

*How has your work plan progressed? Which important milestones could be achieved during the report period? Is the progress of your work in accordance with original planning or has the work plan been changed?*

**SUSY Particle Search and Analysis:** it was foreseen that the analyses will take up to two to three years to be completed. Two publications include work done by this group up to now. While it was initially planned to work on muon final states only, we now also analyse data with electrons in the final state. In addition, an analysis including b-tags was initiated and got pre-approved in 2011 (publication foreseen with full 2011 data in 2012)

**Jet Analysis and Studies for HCAL Upgrade:** the first study was finished after the first year of the group, as foreseen. More work is anticipated in the future.

**E<sub>T</sub><sup>miss</sup> Analysis and Off-line DQM with Physics Objects:** Off-line DQM is done by several members of the group: F.Costanza worked for the technical part of his thesis on core-DQM development, replacing N.Pietsch who did this in 2010, D. Krücker runs the CMS Center (with H. Schettler and E.Ron), ensuring a high quality of offline shifts; D. Horton worked on the E<sub>T</sub><sup>miss</sup> DQM development.

<b>5) Financial Plan / Time Schedule</b> <i>Can you comply with the financial plan and time schedule or do you see a need for adjustment?</i>
The time schedule and financial plan are still fitting, but we would like to improve the hardware part of the project. Therefore, an application for extra money for hardware will be written in 2012.
<b>6) Status</b> <i>Do you hold a joint Junior Professorship or a W2/W3 Professorship? Do you aim for such a position? What is the status of your negotiations in this respect?</i>
Junior Professorship is not possible at the Hamburg University for YIG group leaders.
<b>7) Teaching Activities of the Group Leader</b>
Joint lecture and exercises with K. Lipka: QCD and Physics at the LHC (SS2011)
<b>8) Publications of the Group</b>
<ul style="list-style-type: none"> <li>• Publications with Contributions by the group <ul style="list-style-type: none"> <li>○ CMS Collaboration: Search for supersymmetry in events with a lepton and missing energy, PAS-SUS-11-015</li> <li>○ CMS Collaboration: Search for new physics with same-sign isolated dilepton events with jets and missing energy, PAS-SUS-11-009</li> </ul> </li> <li>• Conference Proceedings: <ul style="list-style-type: none"> <li>○ Altan Cakir, "Searches for Supersymmetry with the CMS Experiment", Nov 2011. 6pp. e-Print: arXiv:1111.4820 [hep-ph], Proceedings of LOMONOSOV11: 15th Lomonosov Conference on Elementary Particle Physics, 18-24 Aug 2011, Moscow (Russian Federation)</li> <li>○ Altan Cakir, "SUSY Searches with the CMS Detector", to be published in Communications, Faculty of Sciences, University of Ankara, Series A2-A3: Physics, Engineering Physics, Electronic Engineering and Astronomy, 2011</li> <li>○ Hannes Schettler, for the CMS Collaboration, "SUSY Searches with Leptons in the Final State at CMS", Nov 2011, e-Print: arXiv:1111.2256 [hep-ex], Proceedings of PIC2011: XXXI Physics in collision, 28 Aug-1 Sep 2011, Vancouver, BC</li> </ul> </li> <li>• Conference Talks (Conferences without Proceedings) <ul style="list-style-type: none"> <li>○ Isabell-A. Melzer-Pellmann, "SUSY Searches at CMS", Plenary talk at SUSY11: Supersymmetry 2011, 28 Aug-2 Sep 2011, Fermilab, Batavia, IL (United States)</li> <li>○ Hannes Schettler: "SUSY-Suche im Leptonkanal mit zwei gegensätzlich geladenen Elektronen oder Myonen", DPG 2011: Frühjahrstagung der Deutschen Physikalischen Gesellschaft, 28 Mar-1 Apr 2011, Karlsruher Institut für Technologie (KIT), Karlsruhe (Germany)</li> <li>○ Matthias Stein: "Search for SUSY in Same-Sign Di-Lepton Final States with the CMS Detector", DPG 2011: Frühjahrstagung der Deutschen Physikalischen Gesellschaft, 28 Mar-1 Apr 2011, Karlsruher Institut für Technologie (KIT), Karlsruhe (Germany)</li> </ul> </li> </ul>
<b>9) External Funding</b>
None
<b>10) Patent Applications</b> <i>No. of pending/granted patents</i>
None
<b>11) Awards received by Group Members / Professorship Appointments offered to Group Leader</b>
None