

Annual Report

Funding Programme:	Helmholtz Young Investigators Groups
Project ID No.:	VH-NG-502
Project Title:	Supersymmetry at the Terascale
Group Leader:	Isabell-A. Melzer-Pellmann
Helmholtz Centre:	DESY
Participating University:	Hamburg University
Report Period (=Calendar Year):	01/2012-12/2012

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;
planned: Somnath Choudhury will start in March 2013
- 2 PhD students paid by DESY: Matthias Stein (thesis defense June 2012), Francesco Costanza;
planned Artur Lobanov will start in February 2013
- 2 PhD students paid by Hamburg University (with money for YIG): Hannes Schettler, Niklas Pietsch
- 1 PhD student funded by the Joachim Hertz Stiftung: Ozgur Sahin
- 1 PhD students defended his thesis (June 2012): Matthias Stein

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). I. Melzer-Pellmann is regularly working as referee for PhD theses and PhD defenses of students of the Hamburg University.

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: The analysis that was performed on the 2012 data is now published in a journal. For 2012, it was foreseen that if a signal for new physics beyond the Standard Model had been observed, we would work on the discrimination between different models. As this is not the case, we continued with the analysis searching for direct stop production, a theoretically well motivated model, consistent with the observation of a Higgs boson of 125 GeV. This study is planned to be presented at a conference in Summer 2013.

Jet Analysis and Studies for HCAL Upgrade: The group has performed studies for the Upgrade of the HCAL and Pixel detector. The analyses have been published in the TDRs. O. Sahin works on the development and integration of the HCAL backend electronics for the

upgrade. E_T^{miss} Analysis and Off-line DQM with Physics Objects: Off-line DQM is done by several members of the group: D. Krücker runs the CMS Center (with H. Schettler and E. Ron), ensuring a high quality of offline shifts; E. Ron has taken over the position as Monte Carlo DQM coordinator.
5) Financial Plan / Time Schedule <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, and we improved the hardware part of the project by applying for extra money for hardware, which was granted by Helmholtz. We ordered already several parts, but not all arrived yet. Therefore, not all money is spent yet.
6) Status <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.
7) Teaching Activities of the Group Leader
None
8) Publications of the Group
<ul style="list-style-type: none"> • Publications with Contributions by the group <ul style="list-style-type: none"> ◦ S. Chatrchyan <i>et al.</i> (CMS Collaboration), "Search for supersymmetry in final states with a single lepton, b-quark jets, and missing transverse energy in proton-proton collisions at $\sqrt{s}=7$ TeV", PRD 87, 052006 (2013). ◦ CMS Collaboration, "CMS Technical Design Report for the Phase 1 Upgrade of the Hadron Calorimeter", CERN-LHCC-2012-015, CMS-TDR-010. ◦ CMS Collaboration: "CMS Technical Design Report for the Pixel Detector Upgrade", CERN-LHCC-2012-016, CMS-TDR-011. • Conference Proceedings: <ul style="list-style-type: none"> ◦ Altan Cakir, "Searches for SUSY in events with third-generation particles at CMS", Nov 2012. 6pp. e-Print: arXiv: 1211.6289 [hep-ph], Proceedings of ICHEP 2012, Melbourne, Australia. • Conference Talks (Conferences without Proceedings) <ul style="list-style-type: none"> ◦ Isabell-A. Melzer-Pellmann, "Searches for SUSY in final states with single leptons at CMS", SUSY 2012, Peking, China, August 2012. ◦ Isabell-A. Melzer-Pellmann, "Recent Results from SUSY Searches at CMS", SFB Colloquium, University of Hamburg, 2012. ◦ Isabell-A. Melzer-Pellmann, "Recent Results from Searches for Supersymmetry with CMS", Seminar talk, DESY Hamburg, 2012; ◦ Altan Cakir, "Recent results from the CMS Experiment", Middle East Technical University, Ankara, Turkey, October 2012. ◦ Elias Ron, "Search for SUSY in events with taus and e,mu at CMS", Hadron Collider Physics Symposium 2012, Kyoto, Japan, November 2012.
9) External Funding
None
10) Patent Applications <i>No. of pending/granted patents</i>
None
11) Awards received by Group Members / Professorship Appointments offered to Group Leader
None