

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):	01/2013-12/2013

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 (left 03/2013), Elias Ron (left 12/2013);
- 3 PhD students paid by DESY: Francesco Costanza; Artur Lobanov (started 02/2013); Karim Trippkewitz (started 06/2013)
- 2 PhD students paid by Hamburg University (with money for YIG): Hannes Schettler (defense 09/2013), Niklas Pietsch
- 1 PhD student funded by the Joachim Hertz Stiftung: Ozgur Sahin
- 1 PhD students defended his thesis (2013): Hannes Schettler

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. A. Cakir is well connected (giving lectures, mentoring students) to several Turkish Universities who are involved in high-energy physics.

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 searching for direct stop production, a theoretically well motivated model, consistent with the observation of a Higgs boson of 125 GeV was performed on the 8 TeV data and is now published in a journal. A summary paper combining searches of different groups and with different final states in in progress. Since 2013 I'm the convener of the "SUSY Future Analyses" working group, being involved in the preparations of the SUSY group for the "Snowmass effort" (U.S. based) and ECFA High-Luminosity LHC studies (Europe based), continuing 2014 towards a technical proposal.

Jet Analysis and Studies for HCAL Upgrade: 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 group members: D. Krücker runs the CMS Center (with H. Schettler and E. Ron), ensuring a high quality of offline shifts; E. Ron was Monte Carlo DQM coordinator until 12/2013.

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 is still fitting, and can oversee that all of the additional 100k Euro for hardware part of the project which was granted by Helmholtz will be spent by the end of the project in 2014.
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 top-squark pair production in the single lepton final state in pp collisions at 8 TeV", EPJC 73 (2013) 2677. M. Berggren, A. Cakir, D. Krücker, J. List, A. Lobanov, I.-A. Melzer-Pellmann, "Non-Simplified SUSY: stau-Coannihilation at LHC and ILC", http://arxiv.org/abs/1307.8076. Y. Gershtein <i>et al.</i>, "New Particles Working Group Report of the Snowmass 2013 Community Summer Study", http://arxiv.org/abs/1311.0299v1. D. Abbaneo <i>et al.</i> "ECFA High Luminosity LHC Experiments Workshop: Physics and Technology Challenges", Report submitted to ECFA, ECFA-13-284, https://cds.cern.ch/record/1631032/. Conference Proceedings <ul style="list-style-type: none"> Altan Cakir, "Search for RP violating Supersymmetry", EPS-HEP 2013 Stockholm, Sweden: PoS(EPS-HEP 2013)264, http://arxiv.org/abs/1310.3598. Conference Talks (Conferences without Proceedings) <ul style="list-style-type: none"> Niklas Pietsch, "Search for Supersymmetry in the four W and multiple b-quark final state", Phenomenology Symposium "Pheno 2013" Pittsburgh, May 2013. Isabell-A. Melzer-Pellmann, "Non-Simplified SUSY: stau-Coannihilation at LHC and ILC", Snowmass 2013, Seattle Workshop, June 2013. Francesco Costanza, "Search for top-squark pair production in the single lepton final state in pp collisions at $\sqrt{s} = 8$ TeV", Poster at the Lepton-Photon Conference, San Francisco, Jun 2013. Isabell-A. Melzer-Pellmann, "Search for signatures of BSM physics at the high luminosity LHC with the ATLAS and CMS detectors", ECFA High Luminosity LHC Experiments Workshop, Aix-les-Bains, France, October 2013. Isabell-A. Melzer-Pellmann, "Non-Simplified SUSY: stau-Coannihilation at LHC and ILC", Linear Collider Forum, DESY Hamburg, October 2013. Dirk Krücker, "Recent results from the CMS Experiment", International Workshop on Future Linear Colliders (LCWS13), University of Tokyo, November 2013.
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