

Annual Report

Funding Programme:	Helmholtz Young Investigators Groups
Project ID No.:	VH-NG-1204
Project Title:	Opening a New Window on Physics Beyond the Standard Model Using the Cherenkov Telescope Array
Group Leader:	Elisa Pueschel
Helmholtz Centre:	DESY (Zeuthen location)
Participating University:	University of Potsdam
Report Period (=Calendar Year):	01/2018- 12/2018

1) Group Structure

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

Currently we have 2 postdocs and two graduate students in the group. A third graduate student has already been selected and is expected to start sometime summer 2019.

In terms of personnel development, both the students have attended schools to increase their expertise in the field generally or in particular areas (e.g. machine learning). One student also followed a course at U Potsdam during autumn 2018. I completed the Helmholtz leadership school.

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).

We are fully integrated into the broader experimental groups at DESY (CTA and VERITAS groups), with group members reporting progress in bi-weekly general meetings.

I am active on a number of committees at DESY, including the PhD board and hiring committees. I was also on the committee for a conference organized by DESY in Aug 2018, and a workshop held at DESY HH in October 2018. I am also an organizer for the weekly astroparticle physics seminar.

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 overall satisfied.

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?

In 2018, the group has become fully active on both the VERITAS observatory (with technical work on simulations and analysis software, scientific work on dark matter searches, measurement of the extragalactic background light, longterm blazar variability studies, and optical interferometry, and service work organizing VERITAS observations) and on the CTA planned observatory (with technical work on analysis software and scientific work on projections for blazar population measurements). The group has been more involved on VERITAS than initially planned, this is due to the delays in the CTA construction schedule.

As a major milestone, the first two papers from the group were submitted and accepted for publication.

5) Financial Plan / Time Schedule

Can you comply with the financial plan and time schedule or do you see a need for adjustment?

The only change foreseen since the last report is that a small sum (~10K) will be spent on disk space.

6) Status

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 do not hold a professorship. I have not yet attempted to negotiate such a position.

7) Teaching Activities of the Group Leader

I co-taught a masters level course in particle physics at U Potsdam in the winter term of 2018/2019. I also gave two lectures on beyond the standard model physics as part of the DESY summer student program.

8) Publications of the Group

[Periastron Observations of TeV Gamma-Ray Emission from a Binary System with a 50-year Period](#)
[VERITAS and Fermi-LAT observations of new HAWC sources](#)
[Measurement of Cosmic-ray Electrons at TeV Energies with VERITAS](#)
[The extreme HBL behaviour of Markarian 501 during 2012](#)
[Measurement of the Iron Spectrum in Cosmic Rays by VERITAS](#)
[Multi-messenger observations of a flaring blazar coincident with high-energy neutrino IceCube-170922A](#)
[VERITAS Observations of the BL Lac Object TXS 0506+056](#)
[HESS J1943+213: An Extreme Blazar Shining Through The Galactic Plane](#)
[A Very High-Energy Gamma-Ray Survey Towards the Cygnus Region of the Galaxy](#)
[Multiwavelength observations of the blazar BL Lacertae: a new fast TeV gamma-ray flare](#)
[A strong limit on the very-high-energy emission from GRB 150323A](#)

9) External Funding

I am a PI on a successful proposal for a joint Helmholtz-Weizmann Institute school on multi-messenger astronomy.

10) Patent Applications

No. of pending/granted patents

None

11) Awards received by Group Members / Professorship Appointments offered to Group Leader

None