

# Welcome and News from KSETA

25 February 2019

Karlsruhe School of Elementary Particle and Astroparticle Physics (KSETA)



# Welcome to the 6th KSETA Plenary Workshop

- This event is an important tradition of KSETA
- Like a „General Assembly“ with all doctoral researchers and all principal investigators
- About 120 participants (out of 160) (this year: 103)
- Opportunity for discussion with external speakers
- Talks and posters by fellows
- Poster award
- Social event



KSETA Poster Award 2018

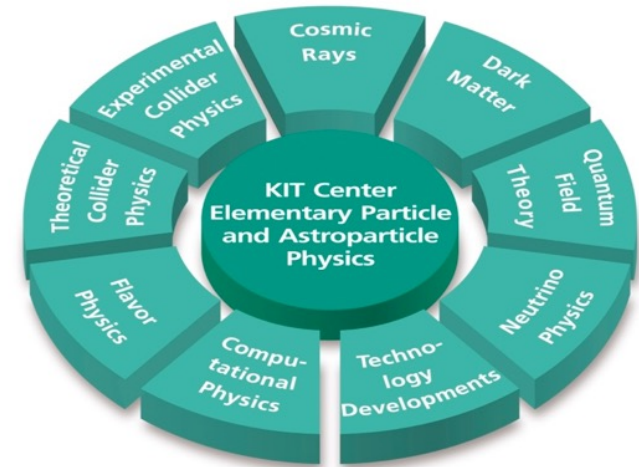


5th KSETA Plenary  
Workshop 2018

# KIT Center Elementaryparticle and Astroparticle Physics (KCETA)



- One out of eight KIT centers
- 11 institutes
- ~ 400 persons
  - 24 professors, 2 young scientist groups
- 4 KIT departments
- 4 out of 5 KIT Divisions, mainly Division V, *Physics and Mathematics*

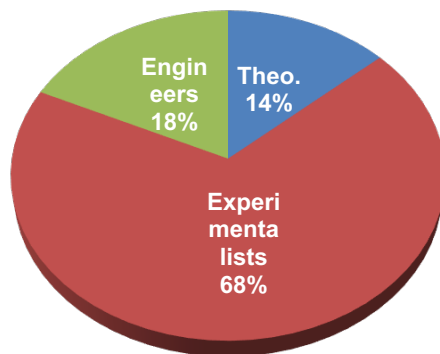


Institute for Experimental Particle Physics (ETP)  
 Institute for Theoretical Particle Physics (TTP)  
 Institute for Theoretical Physics (ITP)  
 Institute for Nuclear Physics (IKP)  
 Institute for Data Processing and Electronics (IPE)  
 Institute for Technical Physics (ITeP)

Steinbuch Centre for Computing (SCC)  
 Institute for Micro- and Nanoelectronic Systems (IMS)  
 Institute for Information Processing Technologies (ITIV)  
 Institute for Technical Thermodynamic and Refrigeration (ITTK)  
 Institute for Accelerator Physics and Technology (IBPT)

## Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA)

- KSETA is the doctoral school of KCETA
- 43 scientists (principal investigators)
- Funding by the German Excellence Initiative since November 2012 with 1.5 M€ per year
- ~ 22 doctoral fellows funded through KSETA
- ~ 97 additional doctoral fellows receiving tangible means, courses, workshops





# KSETA today in figures

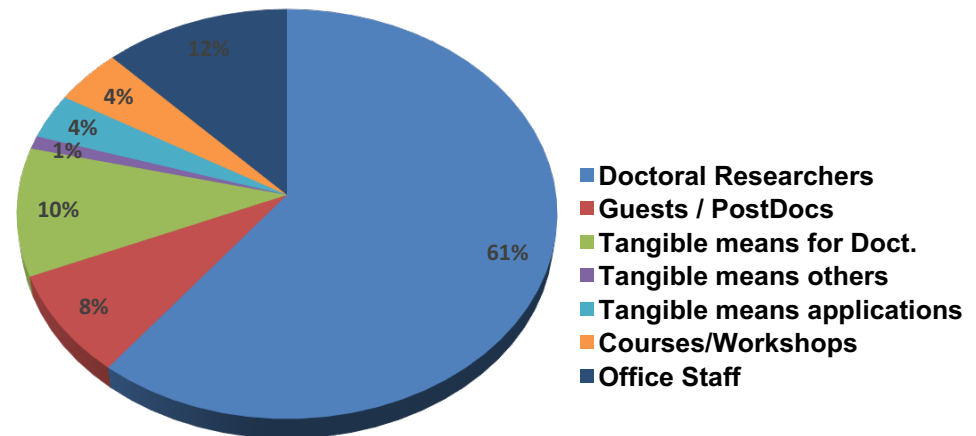
Some statistics (by December 2018)

■ All KSETA Fellows:	119
■ Directly paid by KSETA:	18
■ LGF scholarships:	3
■ DAAD:	5
■ International:	32 (27%)
■ Female:	17 (14%)

## Graduated Fellows

- in 2018: 22 (18%)
- In total: 150
- Not finished: 14 (12%)

Expenses 2018 in T€, %



# New KSETA Fellows in 2018



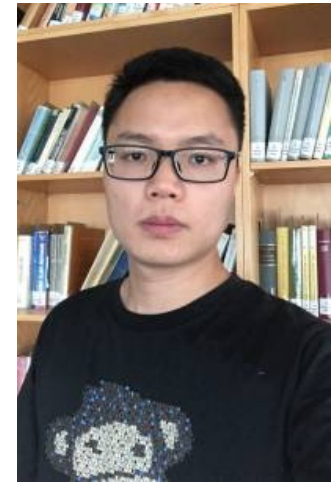
Victoria Tokareva



Matthias Linster



Jonas Müller



Ziliang Wang



Fabian Block



Martin Gabelmann



Felix Schlüter



Mustafa Tabet

# New KSETA Fellows in 2018

David Seith

Heiko Schäfer-Siebert

Michael Eliachevitch

Fabian Block

Albert Zhou

Jabbar Jubna

Martin Schimassek

Vladimir Sidorenko

Philip Keicher

Steffen Hahn

Neeraj Amin

Roland Koppenhöfer

Marie Johanna Oehler

Janek Bechtel

Sebastian Richter

Meghana Patil

Alexander Droll

Patrick Schreiber

# KSETA congratulates.....



Genessis Perez

Mariela Josebachuili

Stefan Zeißler

Nicolas Martin Gonzalez Pintos

Ewa Holt

Carolin Zoller geb. Heidt

Paul Tremper

Ariel Bridgeman

Marco Harrendorf

Simon Kudella

David Schmidt

Melike Akbiyik

Nils Faltermann

Moritz Gelb

Nikolaus Trost

Daniela Mockler

Sarah Müller

Florian Heizmann

Manuel Klein

Nils Braun

Alaa Metwaly Kuotb Awad



**...to their succesful graduation**



# Internships with support by KHYS

- Supported by *Internship Grant* program from KHYS, funded by DAAD
- Five interns from *IIT Bombay and Sardar Vallabhbhai National Institute of Technology in Surat*, India, stayed at KIT in May and June 2018
- Follow-up to the success in 2017
- Participants from report again a very positive experience and a good working atmosphere
- KSETA Fellows recommend this program, because it is an excellent opportunity for both parties to learn from each other

## Interns:

- Belle II, **Jochen Gemmler** (PI Bernlochner): Arpan Ghosal
- IceCube Gen2, **Thomas Huber** (PI Haungs): Khara Jainam Jayesh
- IceTop, **Aswathi Balagopal** (PI Haungs): Chirag Gupta
- CMOS and hybrid sensors, **Mridulla Prathapan** (PI Peric): Sourav Pusti
- milliQan, **Alaa Kuotb Awad** (PI Ulrich): Guarav Mukherjee
- milliQan, **Alaa Kuotb Awad** (PI Ulrich): Arpita Seksaria

IIT Mumbai

Sardar Vallabhbhai  
Nat. Inst. of Techn.

# Internships 2018

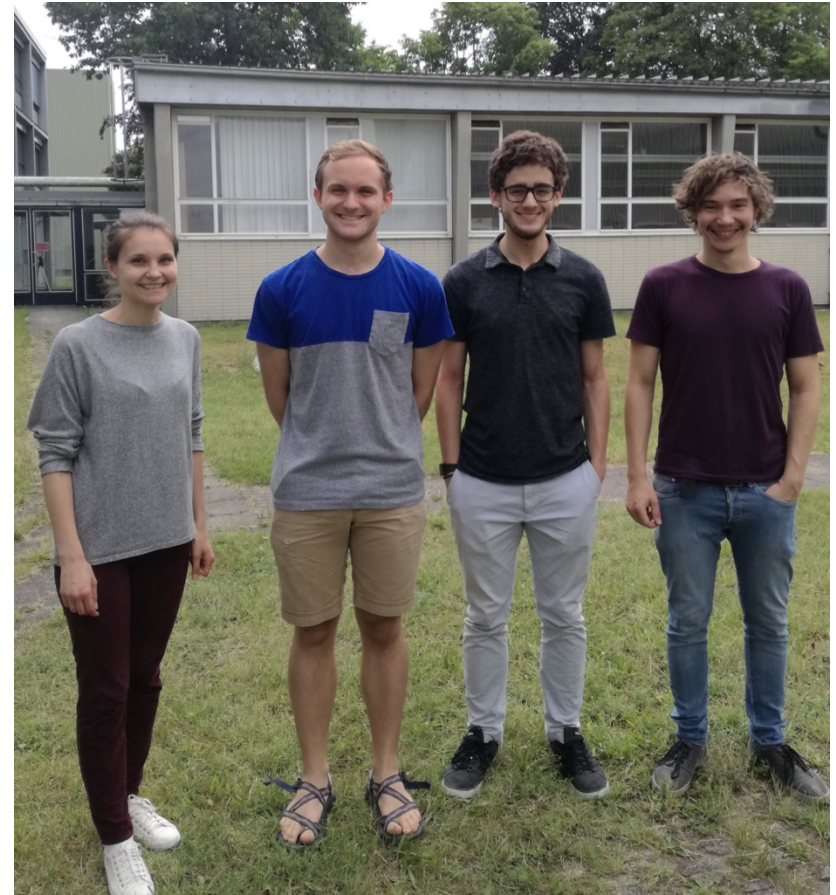


From left to right:

Jainam Khara, Arpita Seksaria, Aswathi Balagopal, Mridula Prathapan, Chirag Gupta, Arpan Ghosal, Jochen Gemmler, Thomas Huber, Sourav Pusti, Ulrich Nierste, Guarav Mukherjee, Andreas Hahmann

# RISE summer internships

- Two KSETA Fellows have been successful with applications in the RISE program (DAAD) and will supervise two summer interns:
- John Crenshaw
- Reed Masek



From left to right:  
Agnieszka Leszczyńska, John Crenshaw, Reed Masek, Max Renschler

# News

- DFG funding reduced in 2019, ending in October.  
+ extra funds by KIT
- sustained funding starts November 2019 by MWK and KIT  
~ 40% of DFG-funding
- two new DAAD stipends to start in 2019
- Successful bid for 4 more DAAD stipends, two stipends starting in 2020  
and 2021 each



# Personal

- Ralph Engel appointed as professor for “experimental astroparticle physics” and director of IKP
- Ulrich Husemann has been elected into the *Vorstandsrat* of the German Physical Society
- Frank Schröder has accepted the offer of a professorship at the University of Delaware



# Guest Scientists

- **Prof. Gustavo Romero (UNSAM)**, Helmholtz International Fellow, visited KIT from October to December 2018.

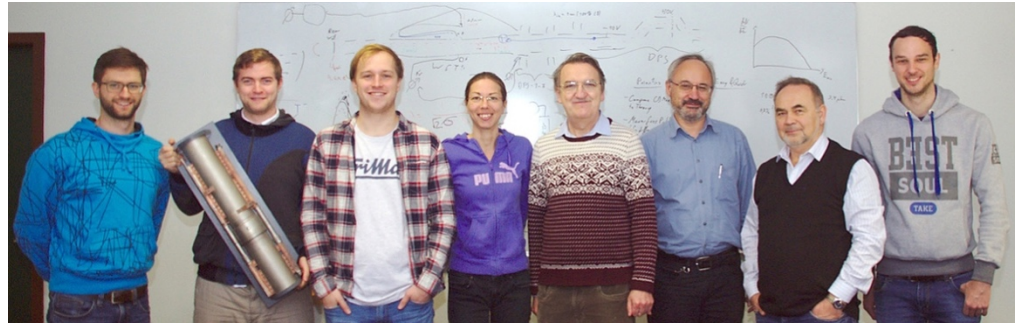


- **Ana Paula Vizcaza Hernandez (Carnegie Mellon Univ., USA)** was a guest of the KATRIN Group from October 8 – 10. She worked with KSETA fellows on the analysis of the first tritium data  
Plenary talk at KATRIN Collaboration Meeting February 2019 together with Fabian Friedel



# Guest Scientists

- **Prof. Sharipov (Parana University, Curitiba, Brazil)** was a guest of the KATRIN Group from November 12-16. He worked with KSETA fellows on modelling the gas distribution in the tritium source and gave a seminar on „Vacuum Gas Dynamics“



- **Prof. Smirnov (MSU, Moscow, Russia)** came to KIT in November 2018 and gave a seminar on Old and New Methods for Multi-Loop Calculations.



# Events in 2018

- In the solemn ceremony on **20. April 2018** in the aula (FTU) the Julius Wess prize was awarded to Francis Halzen
- The scientific talk was given by Elisa Resconi *High Energy Multi-Messenger Observations*
- Laudation given by Johannes Blümer
- The highlight was the talk by Francis Halzen: *IceCube: Opening a New Window on the Universe from the South Pole*



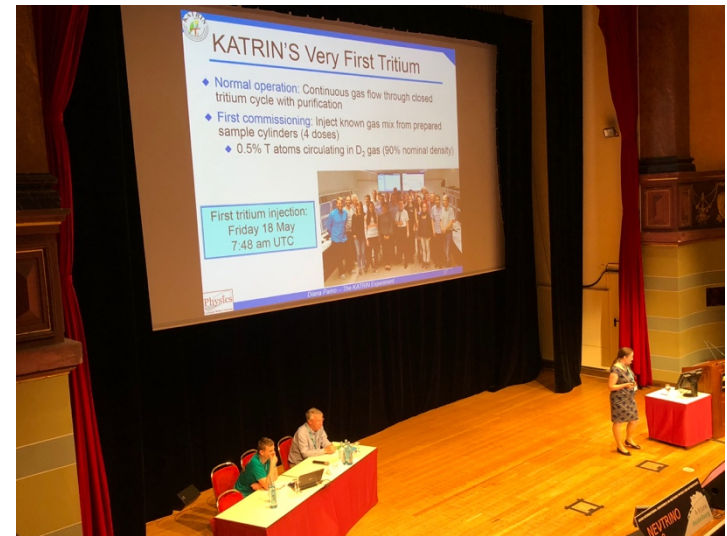
Seminar: 22 – 26 Oct



# Neutrino 2018 – important conference for KATRIN

KIT  
Karlsruher Institut für Technologie

- “KATRIN: Toward a High-Precision Neutrino-Mass Determination with Tritium“ by Diana Parton (KATRIN coll.)



- KATRIN tour: 150 visitors



June 4 – 9, 2018

# KATRIN Inauguration

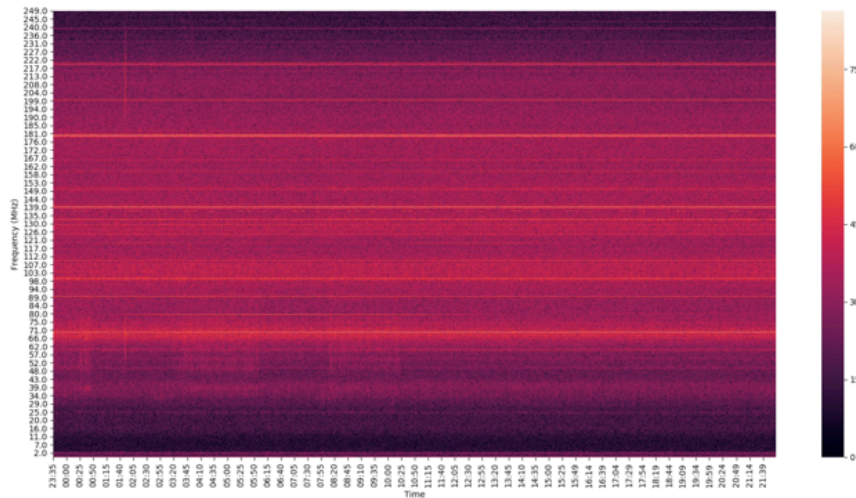
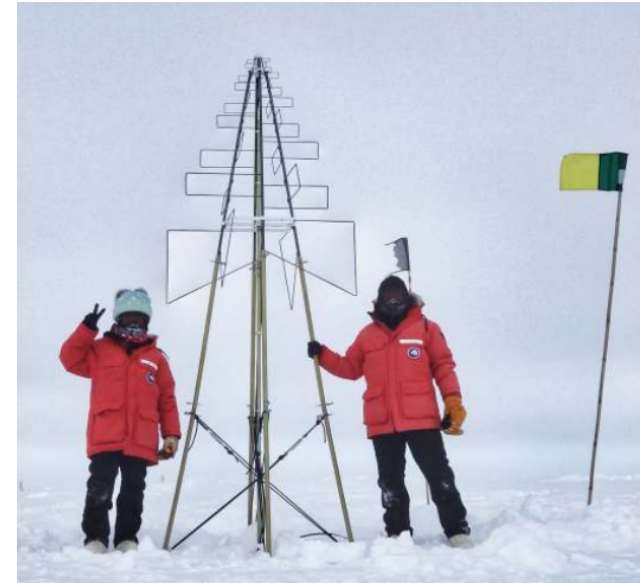
- On June 11, 2018 the official Inauguration of the Karlsruhe Tritium Neutrino Experiment KATRIN took place at KIT Campus North. The event marked the start of the long-term data taking to measure the absolute mass scale of neutrinos with unprecedented sensitivity





# New antenna for IceCube

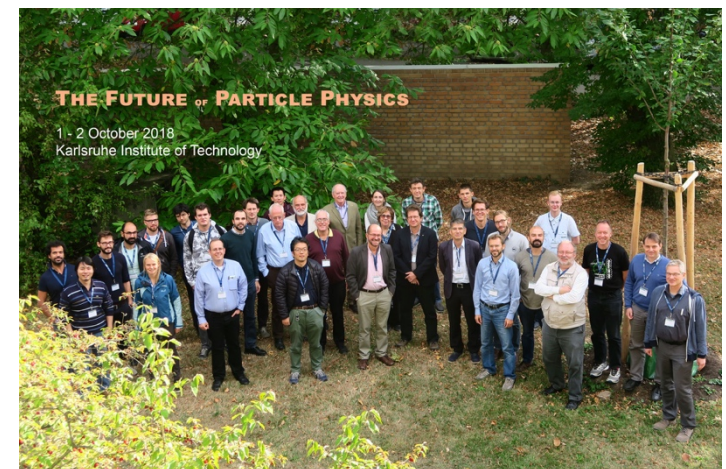
- For measuring cosmic rays (photons) radio antenna are installed in the IceCube experiment at the South Pole. KSETA Fellow Max Renschler was involved in the installation.
- Max arranged to perform a radio signal background measurement for a couple of hours close to the IceCube-Lab building.
- The dynamic spectrum shows some interesting features which are now being analyzed in more details.



Spectrum: x-axis time; y-axis radio frequency; color scale: amplitude

# Conferences at KIT

- **Invisibles 2018** from September 3 – 7, 2018 at KIT with over 140 participants.
  - Contributions and organizational support by KSETA fellows.
- 
- **The Future of Particle Physics: A Quest for Guiding Principles**, from October 1 – 2, 2018
  - organizational support by KSETA fellows





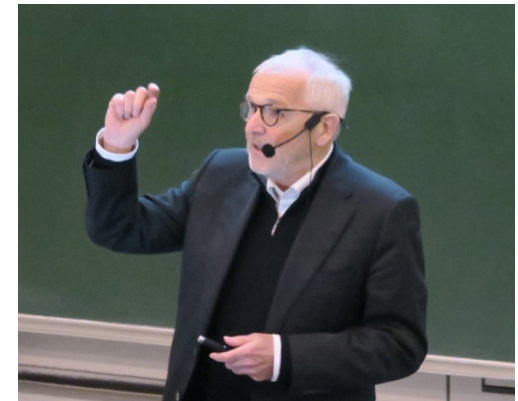
# Wess lectures by Francis Halzen

- October 22 – 26, 2018 at Campus North
- Four lectures on “Opening a New Window on the Universe from the South Pole”



# 10 years celebration of KCETA 26. Oct. 2018

- Grußworte, **Oliver Kraft**
- **Von CETA zu KCETA: Exzellenz in Karlsruhe**, Thomas Müller
- **KCETA Gründung und die ersten Jahre**, Johannes Blümer
- **Colliderphysik und Computing**, Günter Quast
- **KATRIN: eine Waage für das leichteste Teilchen der Welt**, Susanne Mertens
- **Ungelöste Probleme des Standardmodells – die Higgs**  
**Physiklandschaft in Modellen Neuer Physik**, Margarete Mühlleitner
- **Beschleuniger: Technologie für Forschung und Gesellschaft**, Anke-Susanne Müller
- **KCETA heute und morgen**, Marc Weber
  
- Colloquium talk by **Francis Halzen**
  
- Very successful event with many participants



25. Februar 2019 KSETA Welcome



Prof. Ulrich Nierste

# Inauguration of HIRSAP at KIT and UNSAM

- On **April 17, 2018** the first kick-off event for the new Helmholtz International Research School for Astroparticle Physics and Enabling Technologies (HIRSAP) took place at KIT
- On **November 20, 2018** the inauguration of the HIRSAP took place at the Universidad Nacional de San Martín (UNSAM) in Buenos Aires
- The doctoral students presented their research topics at the first HIRSAP workshop



# Double-degree program with UNSAM at work

## Alternating lectures:

### At KIT

- Exploring the inflation era with CMB Polarization**  
 Jean-Christoph Hamilton

### At UNSAM:

- Introduction to Neutrino and Dark Matter**  
 Guido Drexlin

## Doctoral students:

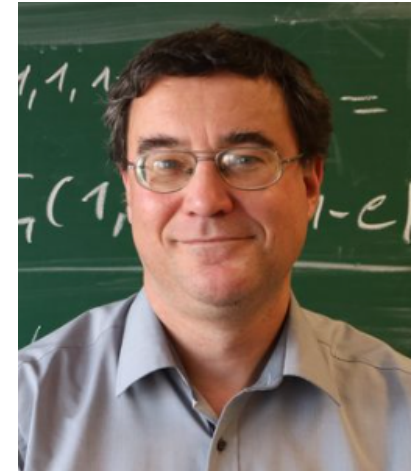


Álvaro T.		Ana B.	
Alexander S.		Johan H.	
Max R.		Gaia S.	
Martin S.		Ana M.	
Max S.		Matías P.	
Steffen H.		Isabel G.	
Felix S.		Marina S.	
		Flavia G.	



# New Collaborative Research Center

- *Particle Physics Phenomenology after the Higgs Discovery*
- *Transregio* of KIT with universities RWTH Aachen, Siegen and Heidelberg, annual fund of 2.6 Mio Euros
- Theoretical research to identify new physics in precision observables of collider and flavour physics
- Spokesperson: Kirill Melnikov



- Monika Blanke
- Stefan Gieseke
- Kirill Melnikov
- Margarete Muehlleitner
- Ulrich Nierste
- Matthias Steinhauser
- Dieter Zeppenfeld



**Collaborative Research Center TRR 257**

**Navigation:** Home, Research, Education, Publications, Events, Members, Internal

**Contact**

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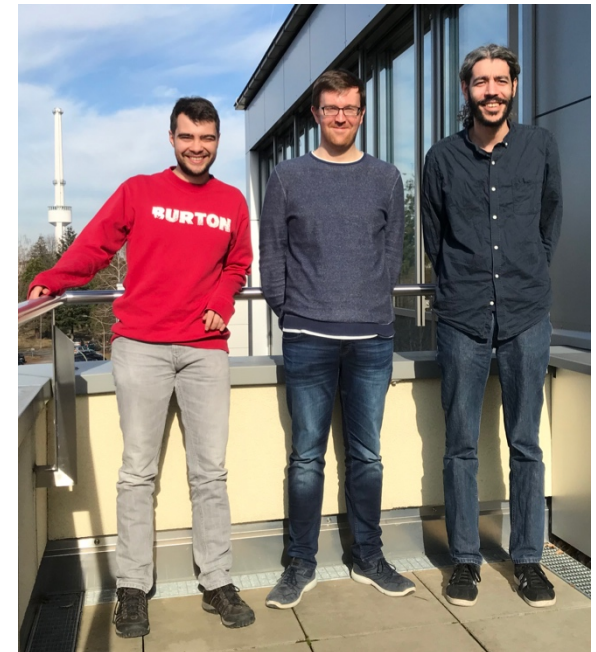
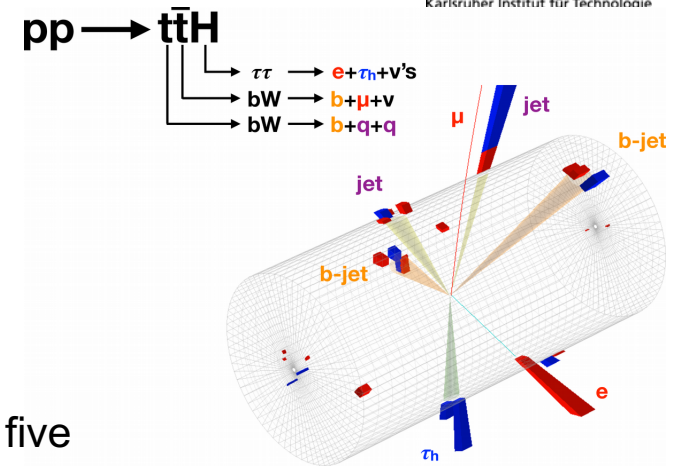
**Administrative Assistant:**  
Martina Schorn  
Karlsruhe Institute of Technology  
[martina.schorn@kit.edu](mailto:martina.schorn@kit.edu)



# Scientific Highlights 2018

## First observation of associated $t\bar{t}H$ production and the decay $H \rightarrow b\bar{b}$

- In the production of a Higgs boson together with a top quark-antiquark pair one can directly study the Yukawa coupling of the top quark.
- CMS has observed this process with a significance of five standard deviations in spring 2018, employing novel machine-learning techniques (Phys. Rev. Lett. 120 (2018) 231801).
- These results were combined with results from other channels to observe the decay  $H \rightarrow b\bar{b}$  (Phys. Rev. Lett. 121 (2018) 121801).
- Instrumental for the success were the KSETA Fellows Karim El Morabit, Michael Waßmer, and Philip Keicher and the former Fellows Hannes Mildner (graduated in 2016), Shawn Williamson (2016), and Marco Harrendorf (2018).



# Awards

- KSETA fellow Denise Müller (ETP) got the award “best talk by young scientist” for her presentation at the "11th International Workshop on Top Quark Physics 2018" with 130 participants
- Frank Schröder received an ERC Starting Grant funding from 01.02.2019 until 31.01.2024
- The proposal essentially builds on the preparatory work by former KSETA fellow Aswathi Balagopal: optimization of the radio frequency band allows now the detection of PeV photons. First prototypes are installed in IceCube at the South pole.
- Aswathi is now PostDoc at IKP



# KSETA Alumni

Selected highlight from AMS-02:

Contributing fellow:  
**Stefan Zeissler**



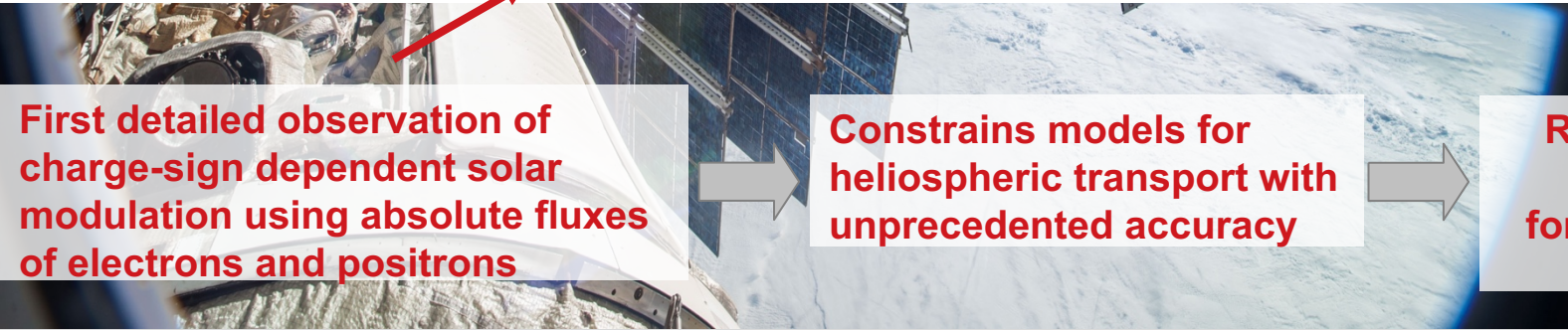
(with M. Graziani, I. Gebauer)

PHYSICAL REVIEW LETTERS **121**, 051102 (2018)

Editors' Suggestion

← 10th editor's suggestion for AMS (out of a total 14 AMS papers in PRL)

**Observation of Complex Time Structures in the Cosmic-Ray Electron and Positron Fluxes with the Alpha Magnetic Spectrometer on the International Space Station**



First detailed observation of charge-sign dependent solar modulation using absolute fluxes of electrons and positrons

→ Constrains models for heliospheric transport with unprecedented accuracy

→ Really, really important for dark matter searches



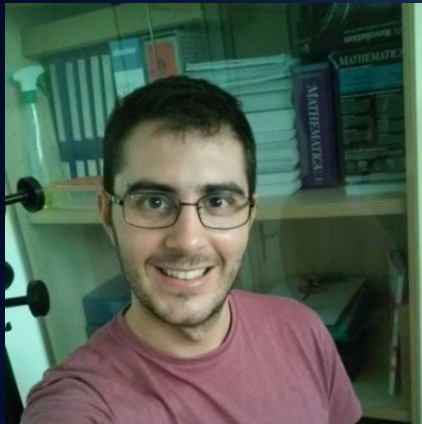
# KSETA Alumni



the AMS group

The road to Space goes through Italy

- MSc at Univ. Pisa/INFN, 2011
- Graduated 2014 within KSETA (AMS group)
- Since then fixed term researcher at INFN Perugia
- Now/soon “scientific researcher” at ASI (=permanent researcher at INFN, but with more space)



**Valerio Vagelli**

## Research topics at ASI:



**AMS-02**



**CTA**

# KSETA Fellows are very active in KIT bodies

- *Doktorandenkonvent of the department of physics:*  
Florian Herren (spokesperson)
- Marcel Krause and Carsten Röttele are two out of three scientific representatives in the board of the KIT Department of Physics
- Bennet Krasch is member of the KIT sounding board for the Excellence Strategy

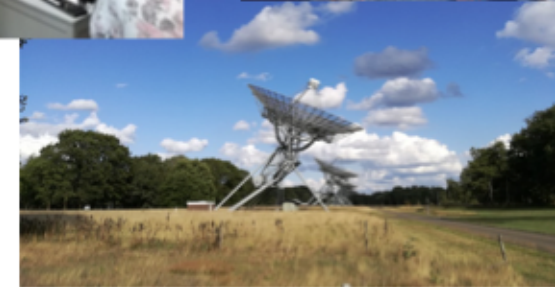
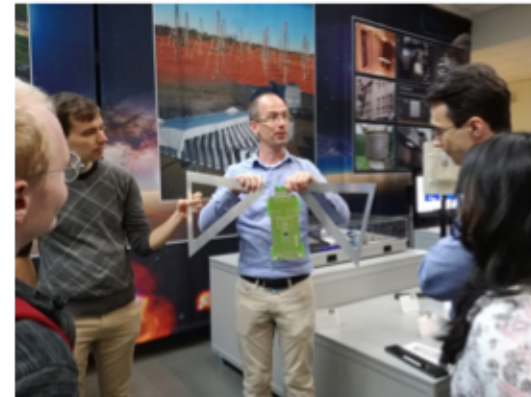




# Activities by KSETA fellows

## Excursion to ASTRON 6. – 7. September 2018

- 12 participants from 4 institutes (3x IKP, 5x ETP, 1x IBPT, ...)
- Travel by bus:
  - arrival: 2pm-10pm (Thursday)
  - overnight stay at hotel
  - return: 6pm-2am (Friday)
- Lots of visits ...
- Special thanks to our guides:
  - Tammo Jan Dijkema
  - Sander ter Veen
  - Olaf Scholten
- And of course to Mrs. Lepold for her help in the organisation!

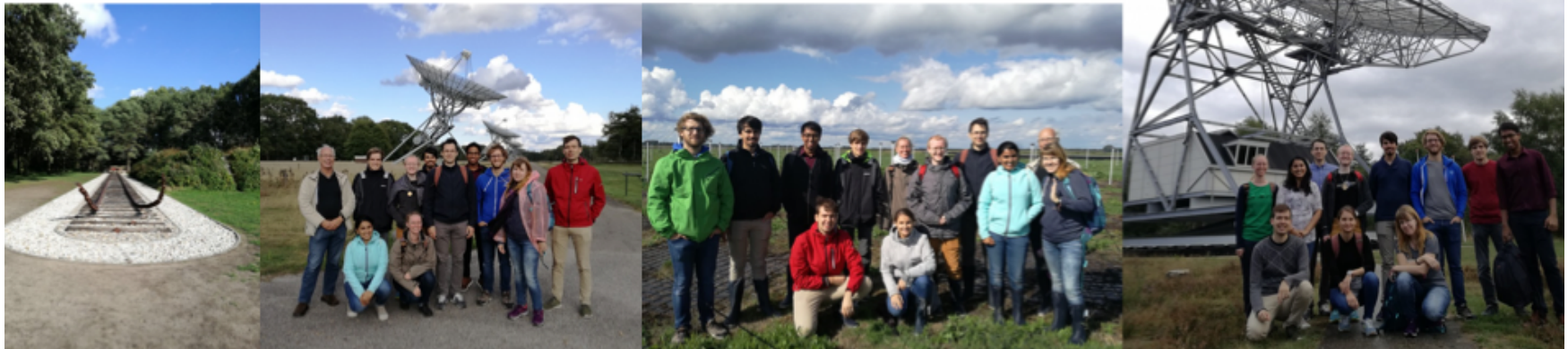


# Activities by KSETA fellows

## Excursion to ASTRON 6. – 7. September 2018

### ■ Friday: lots of visits

- Dwingeloo telescope
- LOFAR control room & full visit to LOFAR site
- Westerbork Synthesis Radio Telescope
- Additionally: Westerbork camp (WWII memorial)



- KSETA Doctoral Workshop 2 – 4 July 2018  
well-attended by 19 participants of 6 institutes
- → will be joined with RTG doctoral workshop (April 2019)

# KSETA Topical Courses 2018

- March 5 – 16, 2018
- 7 Courses (6 hours each, one two-day course)
- Sep 27 – Oct 12, 2018
- 8 Courses (6 hours each, two two-day course)
- Participants:  
spring: about 100  
autumn: about 110
- DEEPER: 5
- BROADER: 6
- BETTER: 4

# KSETA benefits

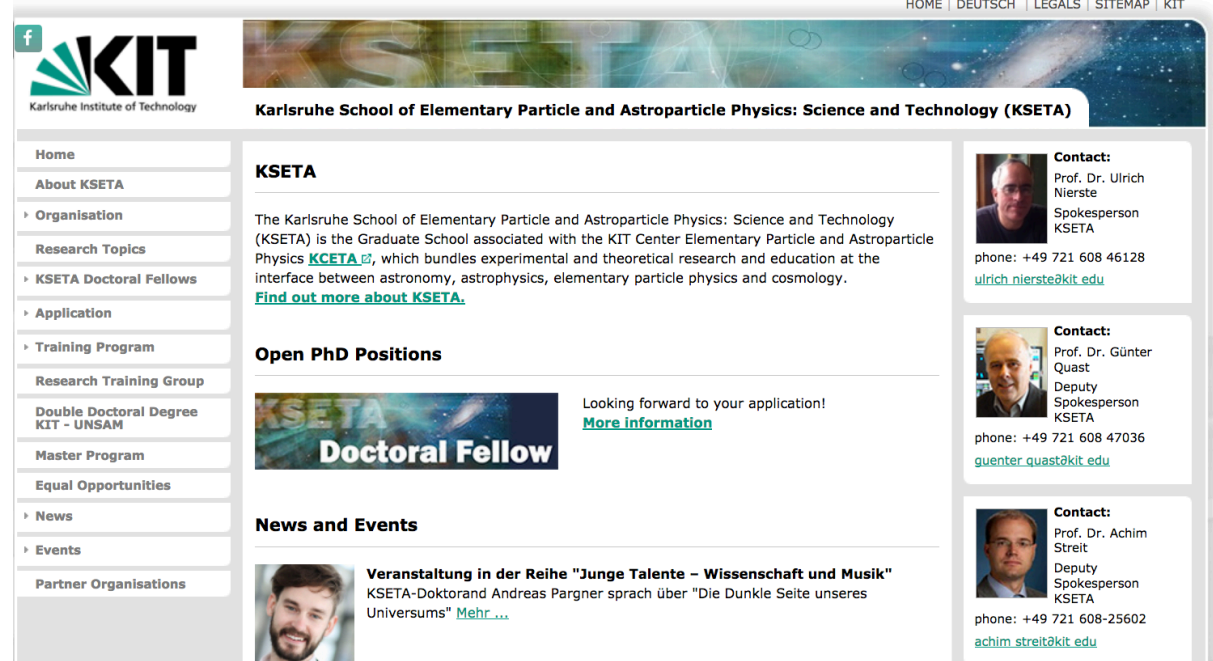
As a KSETA Fellow you benefit from....

- training program with topical courses, special lectures, workshops, guest scientists,
- budget for conference travel and equipment,
- research environment with 119 Doctoral Fellows (Dec. 2018)
- → 19% of you are financed from KSETA sources (including LGF stipends).

# KSETA Webpage is very informative!

- News and events
- Tandem program
- Equal Opportunity support
- Course registrations
- Information

[www.kseta.kit.edu](http://www.kseta.kit.edu)



The screenshot shows the homepage of the Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA). The page features a navigation menu on the left, a main content area with sections for 'KSETA', 'Open PhD Positions', and 'News and Events', and a right sidebar with contact information for three faculty members.

**Navigation Menu:**

- Home
- About KSETA
- Organisation
- Research Topics
- KSETA Doctoral Fellows
- Application
- Training Program
- Research Training Group
- Double Doctoral Degree KIT - UNSAM
- Master Program
- Equal Opportunities
- News
- Events
- Partner Organisations

**KSETA**

The Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA) is the Graduate School associated with the KIT Center Elementary Particle and Astroparticle Physics [KCEPA](#), which bundles experimental and theoretical research and education at the interface between astronomy, astrophysics, elementary particle physics and cosmology. [Find out more about KSETA.](#)

**Open PhD Positions**

Looking forward to your application!  
[More information](#)

**Doctoral Fellow**

**News and Events**

**Veranstaltung in der Reihe "Junge Talente – Wissenschaft und Musik"**  
 KSETA-Doktorand Andreas Pargner sprach über "Die Dunkle Seite unseres Universums" [Mehr...](#)

**Contact:**

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**Contact:**

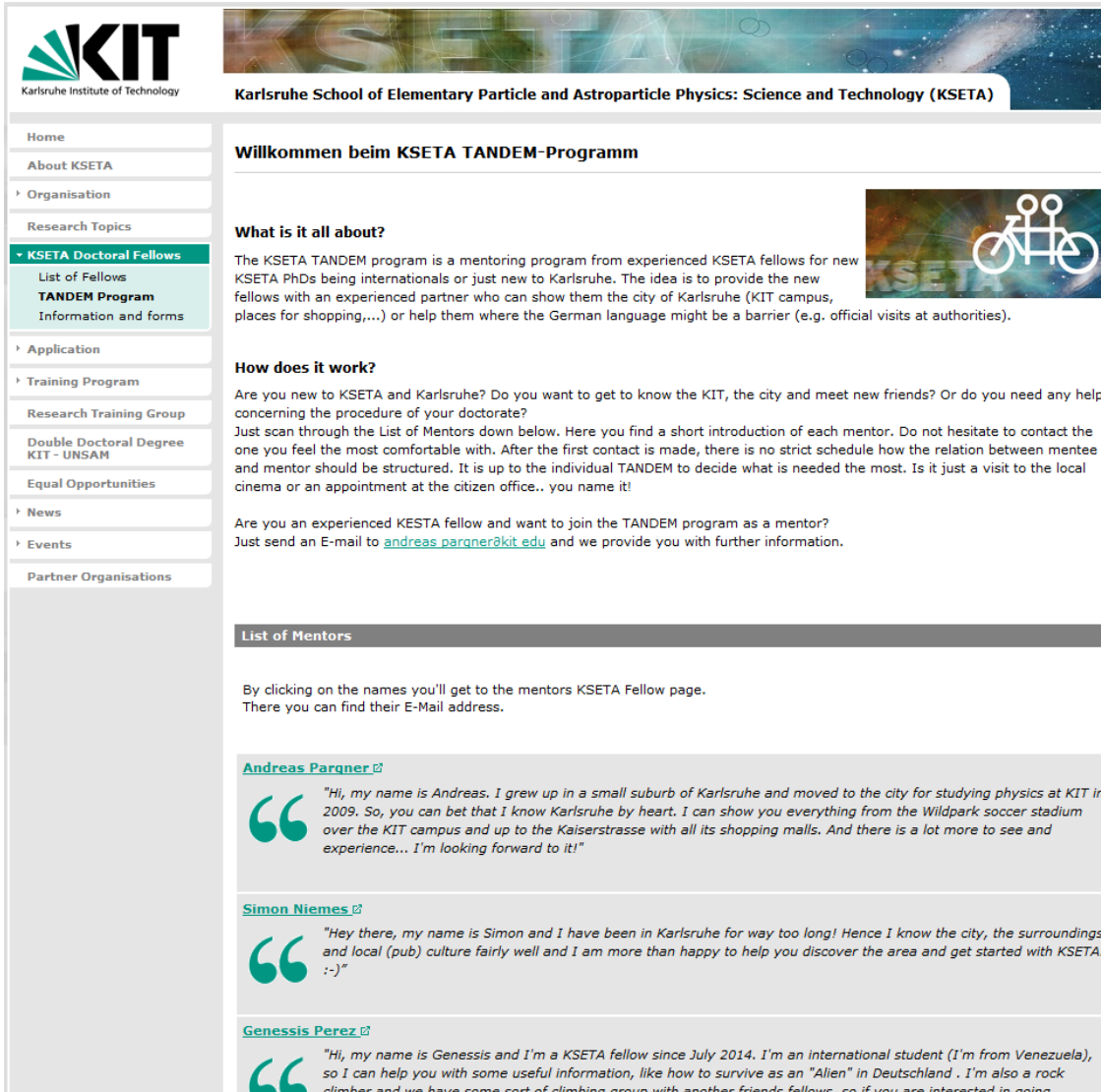
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# Representatives' activities



The screenshot shows the website for the Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA). The main navigation menu includes: Home, About KSETA, Organisation, Research Topics, KSETA Doctoral Fellows (with sub-items: List of Fellows, TANDEM Program, Information and forms), Application, Training Program, Research Training Group (with sub-items: Double Doctoral Degree KIT - UNSAM, Equal Opportunities), News, Events, and Partner Organisations.

The main content area is titled "Willkommen beim KSETA TANDEM-Programm". It contains the following sections:

- What is it all about?**

The KSETA TANDEM program is a mentoring program from experienced KSETA fellows for new KSETA PhDs being internationals or just new to Karlsruhe. The idea is to provide the new fellows with an experienced partner who can show them the city of Karlsruhe (KIT campus, places for shopping,...) or help them where the German language might be a barrier (e.g. official visits at authorities).
- How does it work?**

Are you new to KSETA and Karlsruhe? Do you want to get to know the KIT, the city and meet new friends? Or do you need any help concerning the procedure of your doctorate? Just scan through the List of Mentors down below. Here you find a short introduction of each mentor. Do not hesitate to contact the one you feel the most comfortable with. After the first contact is made, there is no strict schedule how the relation between mentee and mentor should be structured. It is up to the individual TANDEM to decide what is needed the most. Is it just a visit to the local cinema or an appointment at the citizen office.. you name it!

Are you an experienced KESTA fellow and want to join the TANDEM program as a mentor? Just send an E-mail to [andreas.pargner@kit.edu](mailto:andreas.pargner@kit.edu) and we provide you with further information.
- List of Mentors**

By clicking on the names you'll get to the mentors KSETA Fellow page. There you can find their E-Mail address.

  - Andreas Pargner**

"Hi, my name is Andreas. I grew up in a small suburb of Karlsruhe and moved to the city for studying physics at KIT in 2009. So, you can bet that I know Karlsruhe by heart. I can show you everything from the Wildpark soccer stadium over the KIT campus and up to the Kaiserstrasse with all its shopping malls. And there is a lot more to see and experience... I'm looking forward to it!"
  - Simon Niemes**

"Hey there, my name is Simon and I have been in Karlsruhe for way too long! Hence I know the city, the surroundings and local (pub) culture fairly well and I am more than happy to help you discover the area and get started with KSETA. :-)"
  - Genesis Perez**

"Hi, my name is Genesis and I'm a KSETA fellow since July 2014. I'm an international student (I'm from Venezuela), so I can help you with some useful information, like how to survive as an "Alien" in Deutschland. I'm also a rock climber and we have some sort of climbing aroun with another friends fellows. so if you are interested in going

- Tandem programme launched
  - Fellows help new fellows (especially from abroad) with German bureaucracy, show them Karlsruhe and the university
  - Five fellows volunteered (4 male/1 female)
  - Implemented in KSETA welcome guide soon

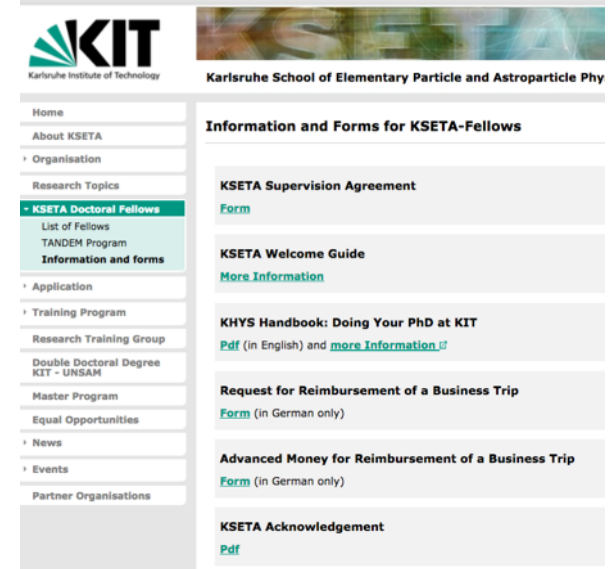
Please advertise TANDEM in your research group!

# KSETA Fellows – rights and duties

- For your rights and duties please consult the KSETA Welcome Guide.

## Important duties:

- attend a minimum number of 6 courses during your 3-year PhD studies,
- write your annual report,
- keep your personal web page up-to-date,
- list your publications in the files publications-reviewed.bib and publications-UNreviewed.bib.
- → We have reporting duties towards our funding agencies and must list the publications.



The screenshot shows the website for the Karlsruhe School of Elementary Particle and Astroparticle Physics (KSETA). The top navigation bar includes the KIT logo and the school's name. A sidebar on the left lists various categories such as Home, About KSETA, Organisation, Research Topics, KSETA Doctoral Fellows (highlighted), Application, Training Program, Research Training Group, Double Doctoral Degree, Master Program, Equal Opportunities, News, Events, and Partner Organisations. The main content area is titled 'Information and Forms for KSETA-Fellows' and lists several key documents: 'KSETA Supervision Agreement Form', 'KSETA Welcome Guide More Information', 'KHYS Handbook: Doing Your PhD at KIT Pdf (in English) and more Information', 'Request for Reimbursement of a Business Trip Form (in German only)', 'Advanced Money for Reimbursement of a Business Trip Form (in German only)', and 'KSETA Acknowledgement Pdf'.

Don't delete  
KSETA emails  
without reading

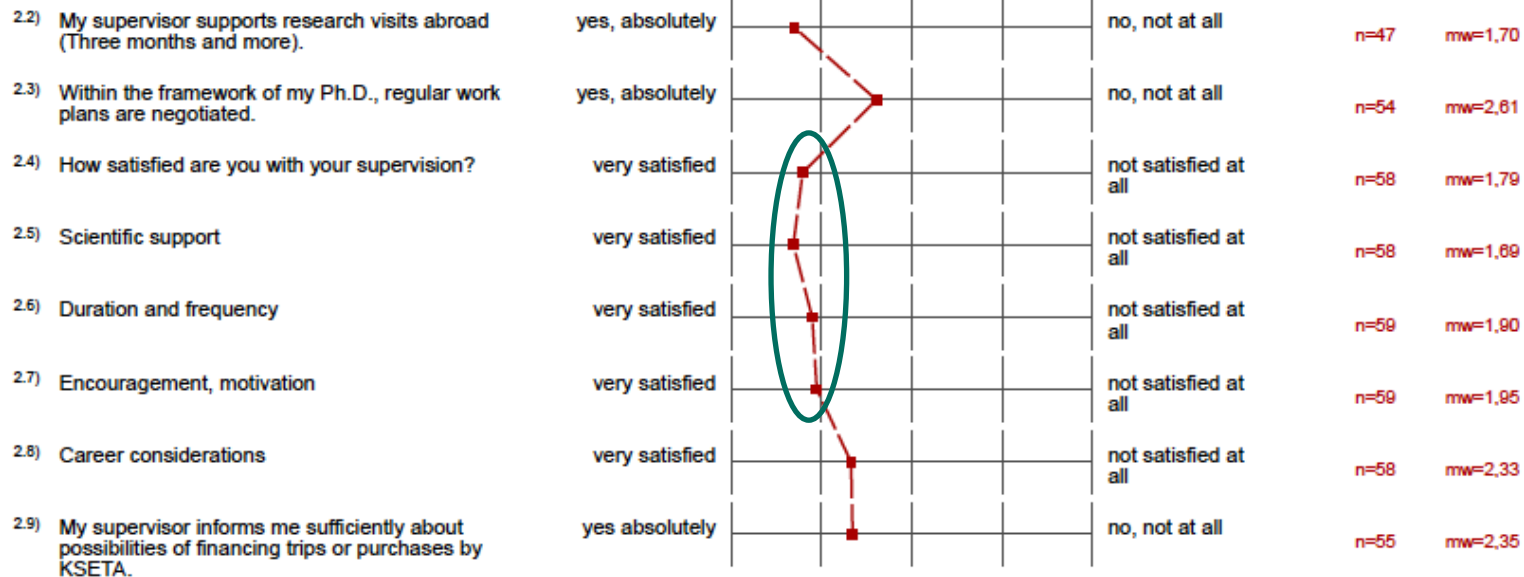


# KSETA Evaluation 2018

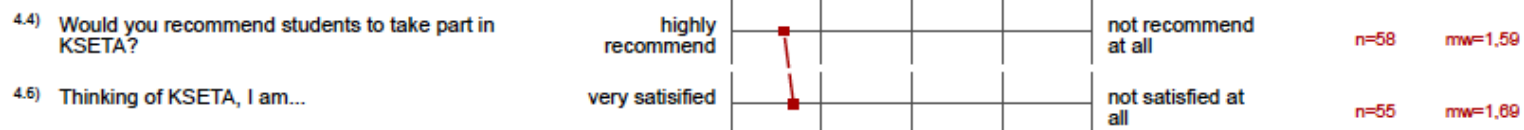
58 participants (2 more than 2017)

Profiles similar to 2017, four aspects better!

## 2. Supervision and support



## 4. Miscellaneous





**Enjoy your stay**

