

Welcome and News from KSETA

Ulrich Nierste
19 February 2020

Karlsruhe School of Elementary Particle and Astroparticle Physics (KSETA)

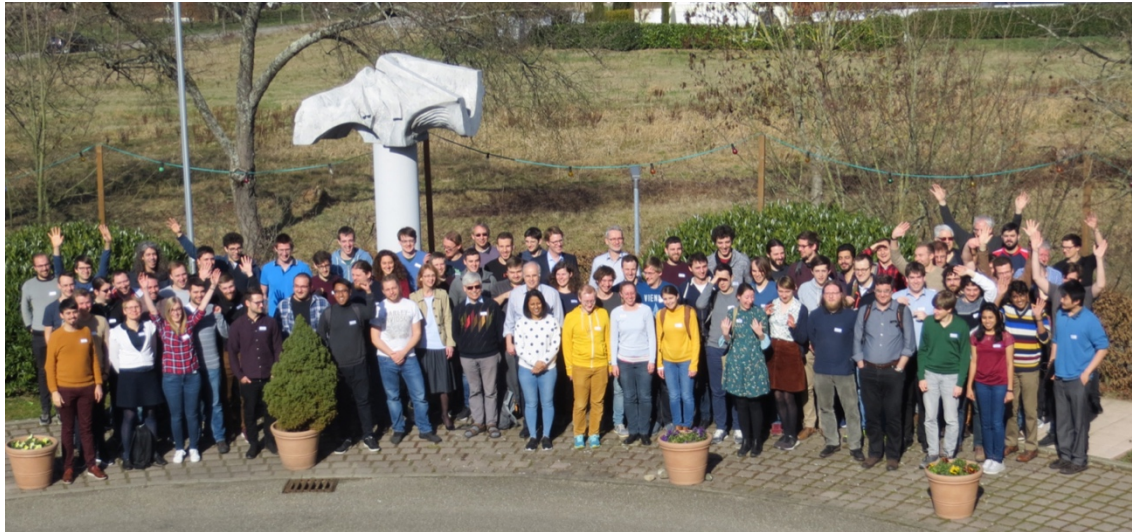


Welcome to the 7th KSETA Plenary Workshop

- 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: 99)
- Opportunity for discussion with external speakers
- Talks and posters by fellows
- Poster award
- Social event



KSETA Poster Award 2019

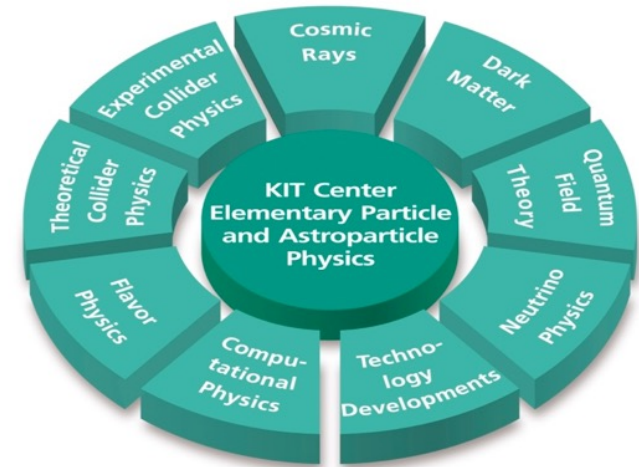


6th KSETA Plenary
Workshop 2019

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*

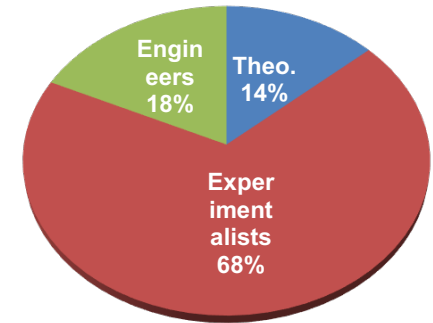


Institute for Experimental Particle Physics (ETP)
 Institute for Theoretical Particle Physics (TTP)
 Institute for Theoretical Physics (ITP)
 Institute for Nuclear Physics (IKP)
 Institute for Data Processing and Electronics (IPE)
 Institute for Technical Physics (ITeP)

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 Nov 2012 — Oct 2019 with 1.5 M€ per year
- Final report after 7 years of funding, October 31, 2019
- In total ~ 76 doctoral fellows funded through KSETA
- All doctoral fellows receive tangible means, courses, workshops



Proposal 2012



Final report 2019

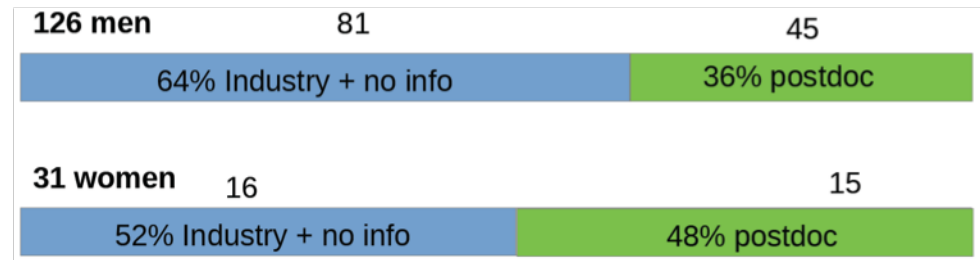


Highlights of the 2012-2019 report

- **167 PhD** theses by Oct 2019 (by now: **186**)
 - 20% authored by women
 - 48% in particle physics, 33% in astroparticle physics, 19% in engineering and informatics

Geographical Origin	Number of doctoral researchers	Percentage of all doctoral researchers
Host university KIT	200	64,3%
Other German universities	39	12,5%
Europe	26	8,4%
World	46	14,8%

- after graduation:



Highlights of the 2012-2019 report

- 460 publications in refereed journals
- 3 Helmholtz dissertation prizes in the research field *Matter*
- 5 *Springer thesis* editions
- 1 technology-transfer project

KSETA in figures

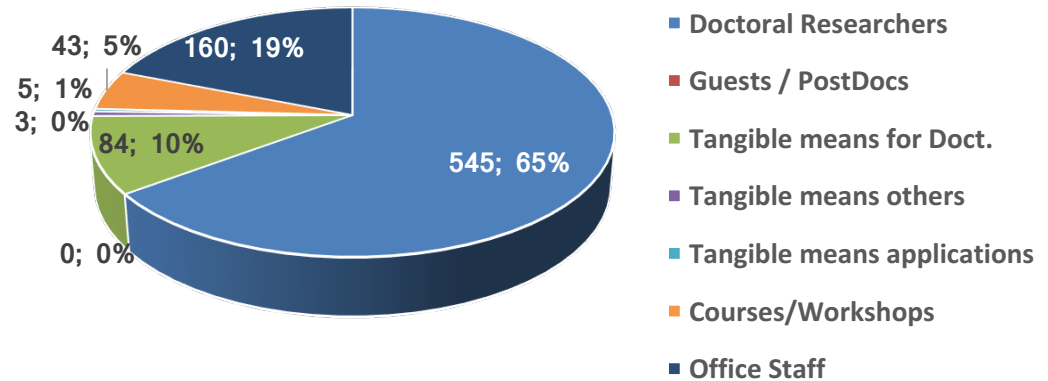
Some statistics (by December 2019)

■ All KSETA Fellows:	114
■ Directly paid by KSETA:	11
■ LGF scholarships:	0
■ DAAD	6
■ International:	29 (25%)
■ Female:	15 (13%)

Graduated Fellows

- in 2019: 30
- In total: 186
- Not finished: 14 (7,5%)

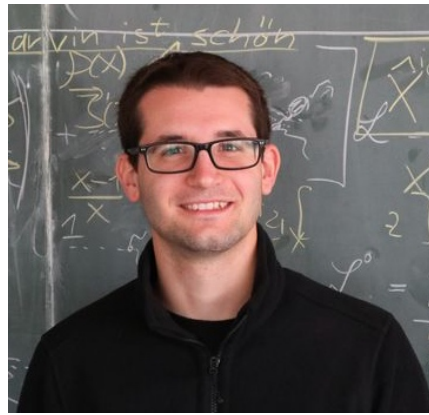
Expenses 2019 in T€, %



New KSETA Fellows in 2019



Sebastian Brommer



Marvin Gerlach



Paras Koundal



Flavia Gesualdi



Martin Descher



Roxanne Turcotte-Tardif



Daniel Baranowski



Olena Tkachenko

New KSETA Fellows in 2019



Maximilian Burkart



Leonard Köllenberger



Dominic Hinz



Harun Acaroglu

Sebastian Wieland

Wenjie Hou

Thanh Tien Dat Nguyen

Kai Lukas Unger

Maximilian Horzela

Max Neukum

Jan von der Linden

Max Aker

Christoph Schäfer

Ekaterina Trifonova

KSETA congratulates.....



Simon Otten

Markus Prim

Roberto Blanco

Andreas Pargner

Hendrik Seitz-Moskaliuk

Aswathi Balagopal

Thomas Deppisch

Daniel Schell

Sebastian Mirz

William Painter

Carsten Röttele

Michael Merker

Tanja Harbaum

Marco Bonetti

Marcel Krause

Jakob Schwichtenberg

Nikkie Deelen

Thomas Berger

Ana Martina Botte

Joachim Debatin

Kirill Kudashkin

Marta Moscati

Alvaro Taboada

Philipp Basler

Daniela Schäfer

Arnaud Andrianavalomahefa

Stefan Maier

Max Renschler

Alvaro Hernández Cabezudo

Johannes Hulsman



...to their succesful graduation

Funding

- sustained funding started November 2019 by MWK and KIT
~ 40% of DFG-funding
- Evaluation March 31, 2020 → 4 Mio € for 2020-2026
- Two new DAAD stipends to start in 2020.
- New application for 2021/2022 pending.

DAAD/KHYS Internships 2019 (*IPID4all*-Program)

- Internships from IIT Bombay summer 2019. Successful work in four projects:
 - KATRIN (Lovish Gulati)
 - Dark Matter signals in geological minerals (Vinay Singh)
 - IceCube-Gen 2 (Amrit Nayak)
 - Dark forces in T_2 , D_2 , H_2 (Sonia Rani and Aman Sardwal)
 - Supervising KSETA Fellows: Fabian Block, Alvaro Hernandez, Mustafa Tabet, Matthias Linster, Thomas Huber

- DAAD *IPID4all*-Program has expired.
- Instead: E-Program (no travel money)
 - OR** KSETA pays everything: ca. 2600 Euro + MWSt per person
 - Projects for 2020:
 - general relativity (Klinkhamer)
 - IceTop-IceCube events of cosmic rays (Haungs)
 - electron angular distributions in KATRIN (Valerius)



RISE summer internships

- KSETA Fellow Marie Oehler was successful with her application in the RISE program (DAAD) and supervised one summer intern:
- Danny Gyampo



New memberships in bodies and committees

New members in KAT (committee for Astroparticle Physics)

- A. Haungs (Cosmic Rays; deputy chair of KAT)
- K. Valerius (Neutrino properties), T. Schwetz-Mangold (Theory)



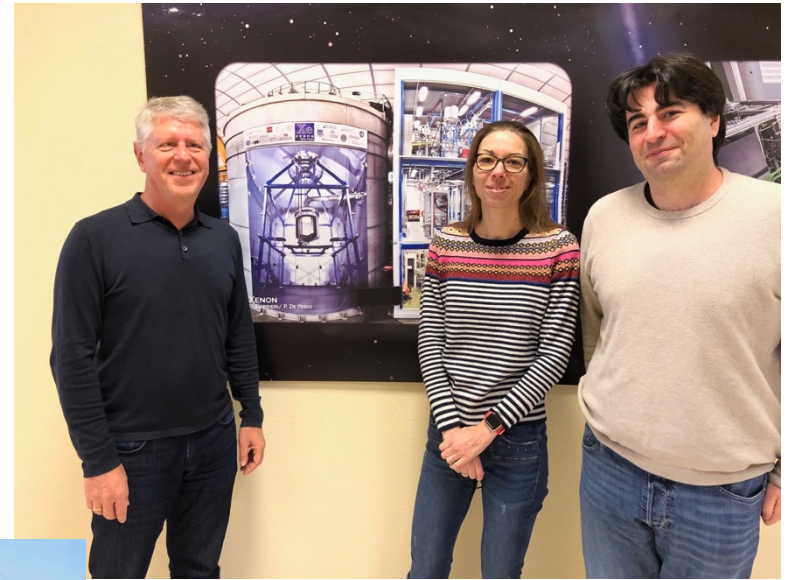
HELMHOLTZ RESEARCH FOR
GRAND CHALLENGES

New leaderships in Helmholtz program „Matter and the Universe“

- R. Engel new spokesperson for the whole program
- K. Valerius new deputy spokesperson of topic 2
“Matter and Radiation from the Universe”

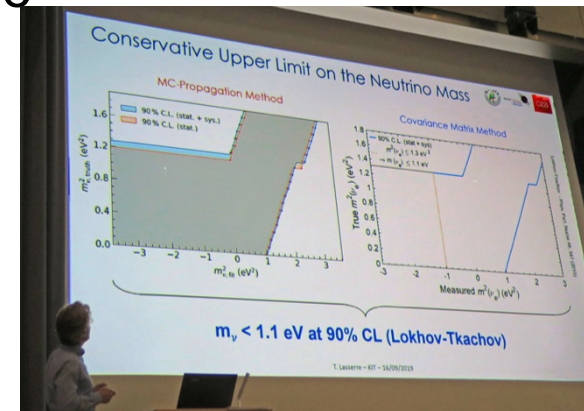
Member of Xenon Kollaboration

- KIT is new member of the XENON collaboration (K.Valerius is PI of the Karlsruher group)
- First participation at the collaboration meeting in Gran Sasso, LNGS, December 2019



Conferences, workshops and other events

- Kathrin Valerius is one of the organizers of the workshop **Determination of the Effective Electron (anti)-neutrino Mass**, February 10 – 14, 2020, Trento, Italy. The workshop is supported by KCETA.
- On **September 16, 2019**, the KATRIN Collaboration presented its new limit for the neutrino mass in a colloquium at KIT. With lectures by Ch. Weinheimer, G. Drexlin, K. Valerius, S. Mertens and Th. Lasserre and a press conference, the extremely impressive result was presented, that far exceeded all expectations.



Julius Wess Award

- In the solemn ceremony on **29. July 2019** in the NTI lecture hall the **Julius Wess prize** was awarded to Sally Dawson
- The scientific talk was given by Giulia Zanderighi *Higgs goes to first grade*
- Laudation given by Dieter Zeppenfeld
- The highlight was the talk by Sally Dawson: *Particle Physics at the cross roads*



Seminar: 09 – 13 Dec

September 11 – 13, 2019 CMS workshop at KIT

- 150 physicists from German research institutions met at the Karlsruhe Institute of Technology (KIT) for their annual meeting. The participants are involved in the large-scale CMS experiment at the European CERN laboratory near Geneva or carry out theoretical calculations for it. At the workshop, the latest scientific results were exchanged and joint strategies coordinated.



Helmholtz International Research School on Astroparticle Physics and Enabling Technologies (HIRSAP)

- The annual HIRSAP workshop took place in the Achat Hotel in Karlsruhe **September 23 – 24, 2019**
- This is the main meeting where all doctoral students present their work.
- The program was complemented by lectures and highlight talks given by M. Unger, D. Schmidt, K. Ganga, M. Platino, M. Bustamante, C. Enss



Activities in HIRSAP and Double-degree programs

- New double-degree program in electrical engineering DDEIT
- Doctoral students marked in the list with *



HIRSAP lectures

January 14 – 17, 2019

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

October 28 – 31, 2019 at UNSAM

- **Galactic Cosmic Rays**
Andreas Haungs



Alexander S. 

Max R. 

Martin S. 

Max S. 

Steffen H. 

Felix S. 

Gaia S. 

Ana M. 

Matías P. 

Isabel G. 

Marina S. 

Flavia G. 

*Manual R. 

*Juan B. 

*Luciano F. 

*Juan S. 

Joaquin J. 

Varada V. 

20th anniversary of Pierre Auger Observatory

- November 14 – 16, 2019:
20th anniversary of the Pierre Auger Observatory
 - 300 scientists and guests at ceremony and scientific symposium
 - The Pierre Auger Observatory studies ultra-high energy cosmic rays, particles of the highest energies ever observed.



A. Watson, first spokesperson



HIRSAP doctoral
researchers



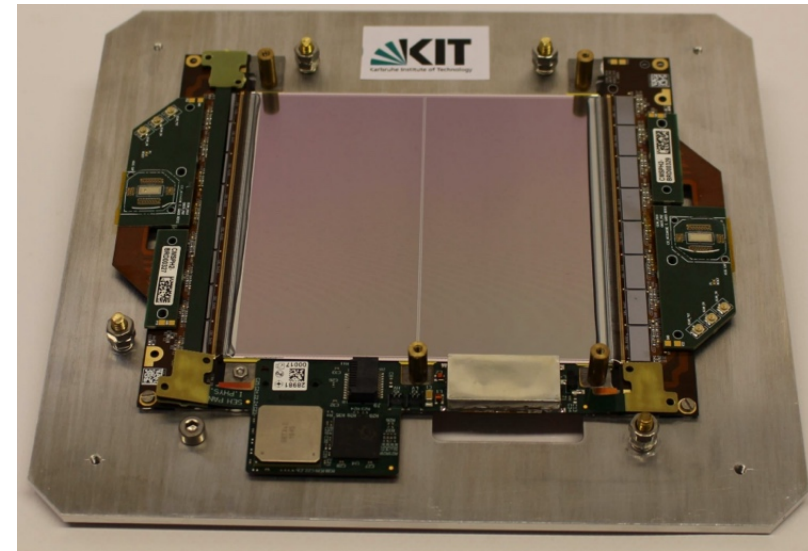
Personal

- Kathrin Valerius elected as “top 40 under 40” by the magazine Capital
- New professorship at KIT for K. Valerius starting March 2020
- Klaus Rabbertz has taken over responsibility for the QCD report of the PDG Review of Particle Physics (together with colleagues G. Zanderighi (MPI Munich) and J. Husten (Michigan State U.)



Awards

- **Stefan Maier** received the „CMS Detector Awards 2019“ for his outstanding contributions to the upgrade of the Outer Tracker, including development of procedures and systems in 2S module assembly and qualification and the development of a high-rate test stand for the module readout chain.



Full-size 2S module prototype assembled and tested at ETP

- **Marta Moscati** (Theory) got the “Award for the best talk” in the field Frontiera dell'Intensità at the IFAE 2019 (Incontri di Fisica delle Alte Energie)



Scientific Highlights

- Exactly thirteen years after the main spectrometer of KATRIN was transported in a spectacular action through Eggenstein-Leopoldshafen to Campus North of KIT, the collaboration published its first results of the neutrino mass measurements. That's worth a place on the **cover of the Physics Review Letters!**
- M. Reininghaus et al., Towards the next generation of **CORSIKA**: A framework for the simulation of particle cascades in astroparticle physics, *Computing and Software for Big Science* 3, 2 (2019)



KATRIN – new limit for the neutrino mass

- For the first time high-purity tritium gas was circulated over weeks through the source cryostat, and **high statistics energy spectra** of electrons were collected in spring 2019.
- Three international team independently analyzed blinded data from this measurement campaign. All three groups announced identical results, which limit the **absolute mass of neutrinos** to a value of **less than 1 eV at 90% confidence**.
- The results have been presented to the scientific public at the 16th International Conference on Topics in Astroparticle Physics and Underground Physics (TAUP) 2019, Toyama



ν -mass and E_0 : best fit results

$$m^2(\nu_e) = \left(-1.0 \begin{matrix} + 0.9 \\ - 1.1 \end{matrix} \right) \text{eV}^2 \text{ (90\% CL)}$$

- Aker et al., An improved upper limit on the neutrino mass from a direct kinematic method by KATRIN, Phys. Rev. Lett. 123, 221802 (2019)

LOFAR radio telescope looks into lightning

- LOFAR consists of thousands of antennas spread across Europe observing radio signals from cosmic rays
- Analyses of high-resolution data from the LOFAR radio telescope has now discovered needle-shaped structures in lightning that could bring light into the discharge processes.
- Main contributions to this technology have been developed at KIT by the group of KSETA PI Tim Huege



- Brian Hare, Olaf Scholten et al. Needle-like structures discovered on positively charged lightning branches. Nature, 18 April 2019, DOI: 10.1038/s41586-019-1086-6

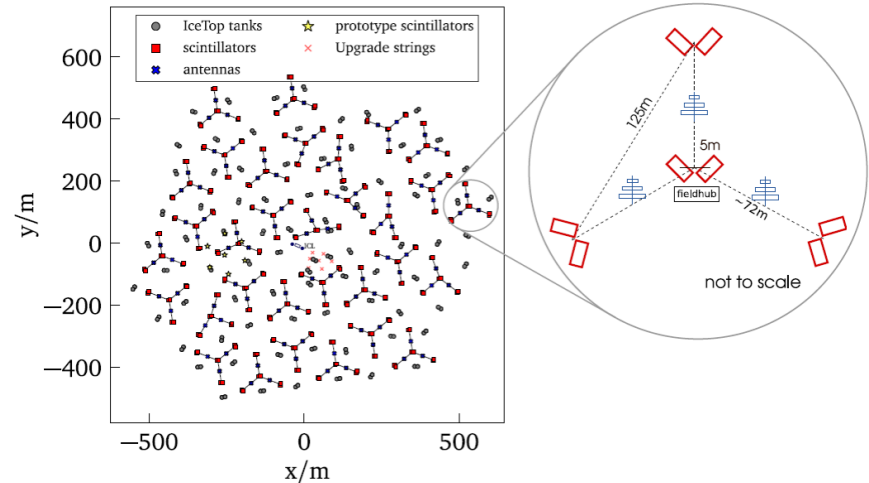
First Radio Antenna for Pierre Auger Observatory

- First antenna for the **radio upgrade**, which is part of the **AugerPrime upgrade**, is a very important part of the future research of the Pierre Auger Observatory by adding array-based composition sensitivity for large zenith angles, for which the scintillator upgrade is not effective:
 - crucial for composition-improved anisotropy studies
 - adds to the overall aperture of the observatory
- KSETA fellow Felix Schlüter (second from left)
 - F. Schlüter et al., Classification and Recovery of Radio Signals from Cosmic Ray Induced Air Showers with Deep Learning, JINST 14 P04005 (2019)



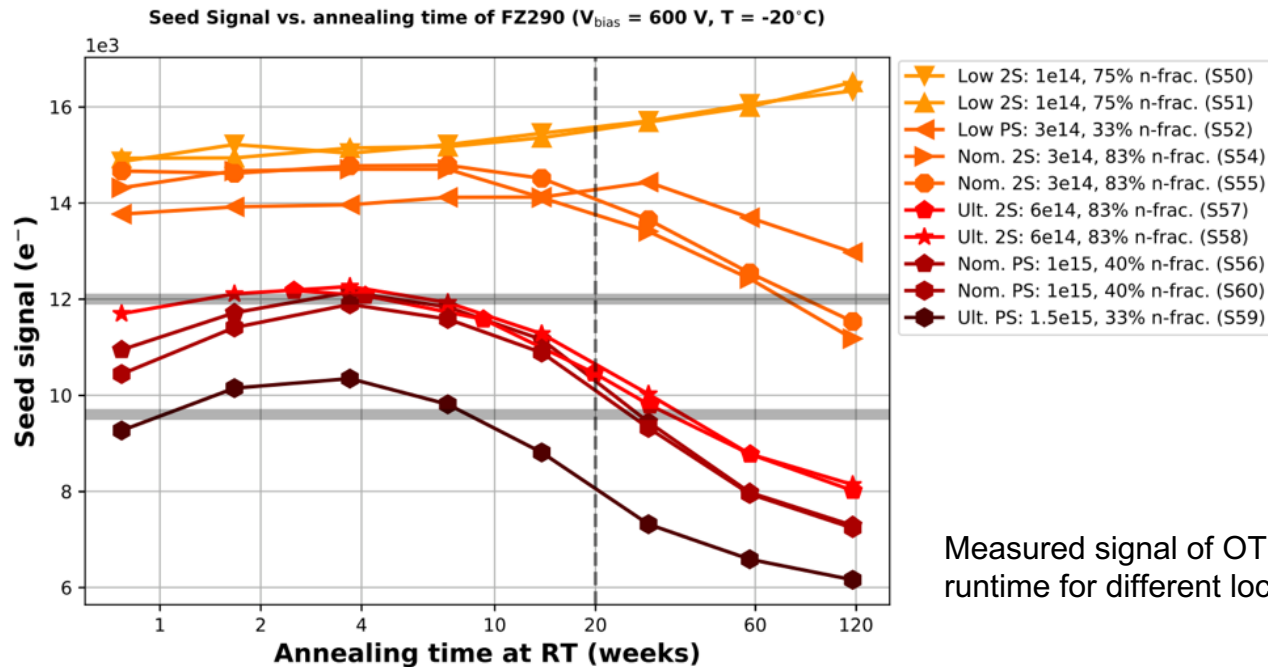
Surface enhancement of IceCube

- For measuring cosmic rays (photons) radio/scintillator hybrid stations are installed in the IceCube experiment at the South Pole.
- The first station was deployed January 2020 by KSETA Fellow Marie Oehler and KSETA PI Frank Schröder.
- Further 31 stations built at KIT shall be installed in next 4 years.



Awards and achievements at ETP

- Marius Metzler and Alexander Droll** contributed significantly to the qualification of the sensor material which is now approved to be procured for the entire CMS Outer Tracker: 30000 sensors worth ~20MCHF.



Measured signal of OT sensors at the end of the expected runtime for different locations in the Outer Tracker

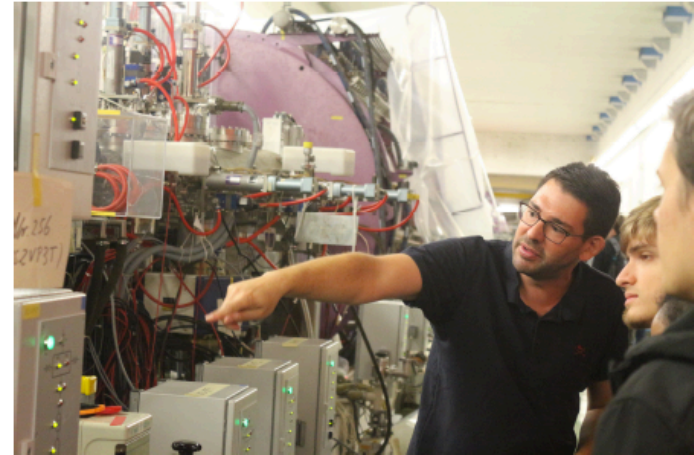
Activities by KSETA Fellows

- April 15 – 17, 2019
Bad Herrenalb
Joint workshop of GRK and
KSETA



Excursion to GSI 2019

- daytrip to GSI on September, 2nd
- 25 participants from 7 institutes (ETP, IBPT, IKP, IPE, ITP, LAS, TTP)
- very dedicated contact person Daniel Severin organized the visit for us - special thanks to him!
- also thanks to the other guides and Mrs. Lepold for her help with the organization



Exkursion to GSI - program

- in the morning, Daniel gave us
 - an introductory lecture to GSI and
 - a tour of GSI facilities (accelerator, ...)
- in the afternoon, we had
 - special sessions about biophysics, plasma physics and IT by GSI PhD students and postdocs and
 - a tour of the FAIR construction site by head engineer
- evening: joint dinner in Karlsruhe
- positive feedback by participants
- GSI students are interested in visiting Karlsruhe - further corporation?

KSETA Topical Courses 2019

- April 1 – 16, 2019
 - 6 Courses (6 hours each)
- June 6 Scientific Journalism
- Sep 30 – Oct 4, 2019
 - 7 Courses (6 hours each)
- Participants:
 - spring: about 160
 - autumn: about 90
- Most interesting topics:
 - machine learning and Python
- DEEPER: 4
- BROADER: 10
- BETTER: 1

KSETA Fellows are very active in KIT bodies

- *Doktorandenkonvent of the department of physics:*
Maximilian Deltow
- *Board of KIT Department:*
Heiko Schäfer-Siebert
- *Spokesperson for PostDocs and doctoral researcher in SFB/TRR 257:*
Martin Gabelmann



KSETA benefits

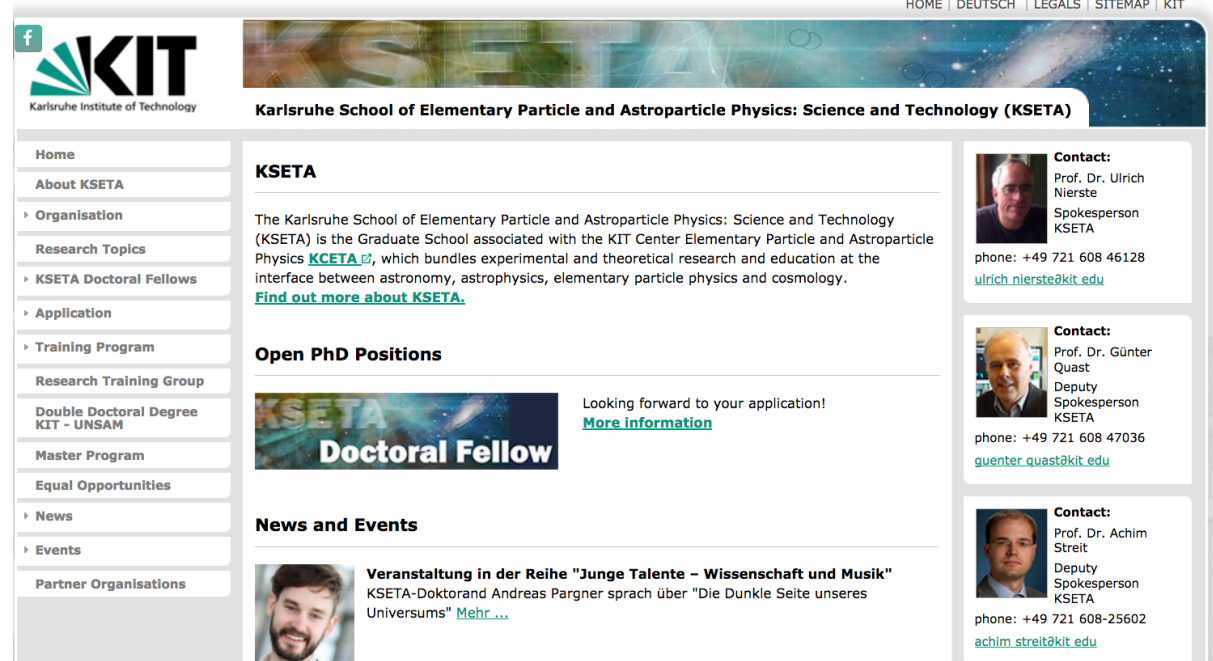
As a KSETA Fellow you benefit from....

- 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



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...](#)

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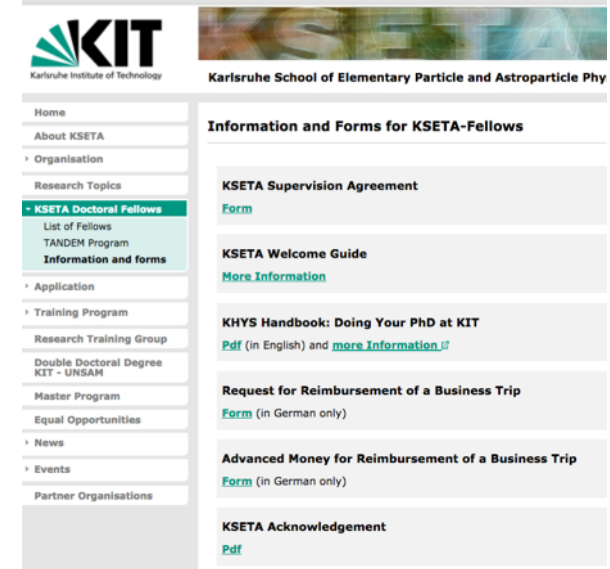
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achim.streit@kit.edu

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



Web page and publications

Web pages and publication lists are a **serious** topic.

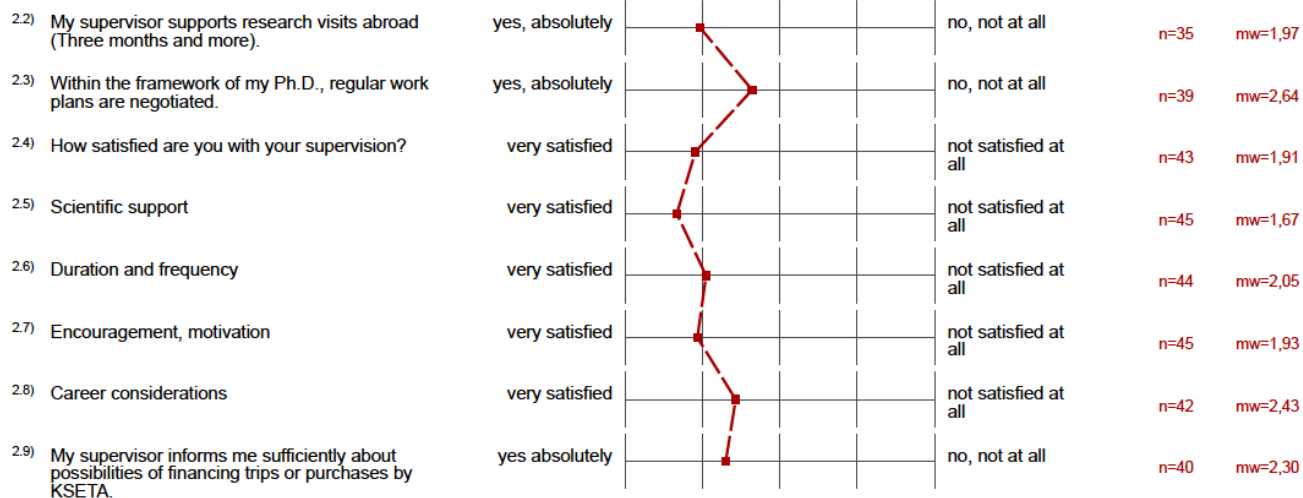
- Reviewers are likely to look at the web pages.
- Web pages contain all relevant information for all reporting.
- When we prepared the publication list for our 2019 reports, we observed that
 - many publications were missing
 - reviewed and unreviewed publications were not properly separated

- If possible, use INSPIRE BibTeX entries for your .bib files and include the DOI number for the reviewed papers.

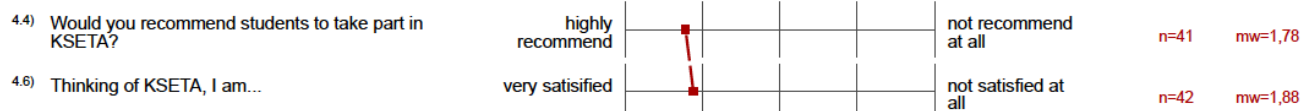
KSETA Evaluation 2019

- Only 45 fellows completed the questionnaire
- Nearly all aspects rated poorer by 0.1 or 0.2 points compared to last year

2. Supervision and support



4. Miscellaneous



Enjoy your stay

