



KHuK Annual Meeting, Zoom, 9-10 Dec. 2021

Report from KAT

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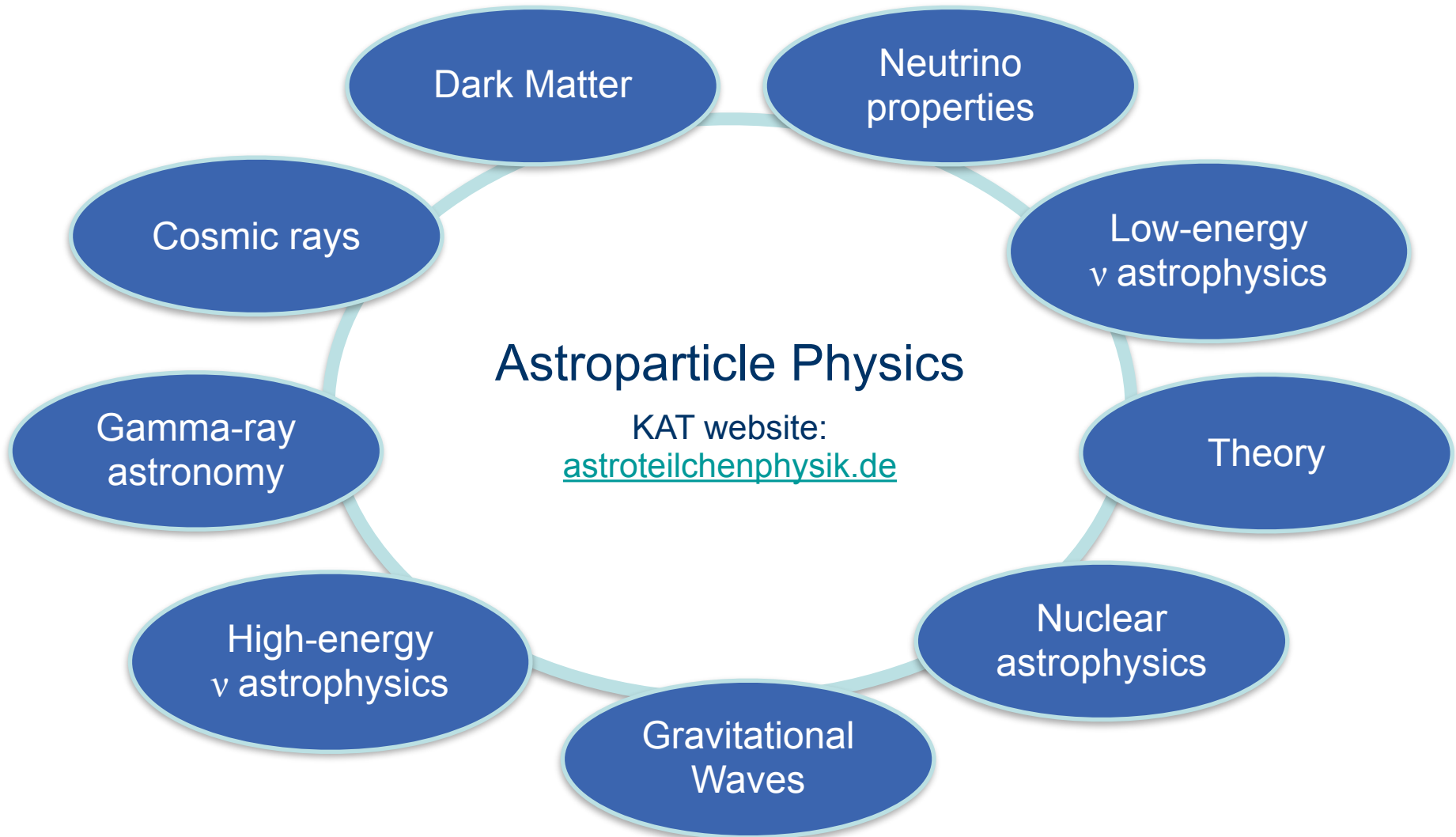


Outline

- **Report:** ErUM-Pro funding period 2020-2023
- **Report:** Joint initiatives BMBF+LNGS and BMBF+JINR
- **Outlook:** KAT Strategy Process 2022
New ErUM-Pro call; prioritisation of large-scale future projects
- **Recap/Outlook:** Surveys and Roadmaps
ESFRI, ASTRO 2020, APPEC, Helmholtz, BMBF, ...

Most material drawn from report of Uli Katz (KAT Chair)
at the Annual Meeting, 2-3 Dec. 2021

Constituencies of KAT



Projects:

- CTA, IceCube, Pierre Auger (gamma-rays, neutrinos, cosmic rays)
- KATRIN (neutrino mass)
- GERDA → LEGEND ($0\nu 2\beta$)
- XENONnT & CRESST-III; preparation of DARWIN (direct DM searches)
- Gravitational waves → 3rd-generation instrument(s)
- Note: None of the cross-topical applications has been funded.

Observations:

- Employment situation of PhD students: still an issue in need of attention. Concerns in yHEP report → contract notification time, remuneration.
- COVID-related problems (isolation, hiring processes, Zoom fatigue, ...) Nevertheless: lots of progress → highlight presentations

BMBF: Joint initiatives

- BMBF support for **LNGS infrastructure** in the framework of a bilateral German-Italian cooperation
 - 2019-20: KAT closely involved in planning process
 - 12/2020: Funding approval for 8 projects
 - Now: Work under way (typ. 2-4 years grant duration)
- BMBF in process of upgrading structure of **cooperation agreement** with **JINR/Dubna**, Russia
 - Spring 2021: ~100 k€ for astroparticle funding available in Russia, call for cooperation projects
 - 5 Projects selected
 - Hardware/invest was realized in 2021, but travel not possible

The KAT strategy process

- Goal: Provide BMBF with an agreed-upon view of the astroparticle community on priority research topics and projects.
- Will directly impact on
 - Strategy meeting with BMBF
 - New ErUM-Pro call (“Verbundforschung”)
 - Prioritisation of large (i.e. beyond-ErUM-Pro) projects.
- Produce new brochure 2019 → 2022
Stronger emphasis on knowledge transfer, sustainability, climate, education, etc.
- Target date: May 2022.



Hot topics 2019/2022

- Gravitational Waves: First appearance in ErUM-Pro (R&D for next-generation GW detector)
- Towards future projects:
 - Vorbereitung von DARWIN
 - Vorbereitung und R&D for IceCube-Gen2
 - Vorbereitung von LEGEND-1000

Note: these were beyond the funding horizon in 2019
- During proposal phase: remuneration of PhD students

2019

- Funding of above-mentioned future projects
- Einstein Telescope - activities across communities
- Deutsches Zentrum für Astrophysik
- ...

2022

Updates on future projects

Excerpts from overview presentations at the KAT annual meeting
(IceCube-Gen2, DARWIN, LEGEND-1000, ET)
... and news on DZA.

IceCube-Gen2: The Window to the extreme Universe

Marek Kowalski (DESY & Humboldt University of Berlin)

for the German IceCube and IceCube-Gen2 groups

KAT strategy meeting, Bad Honnef (almost) 2021

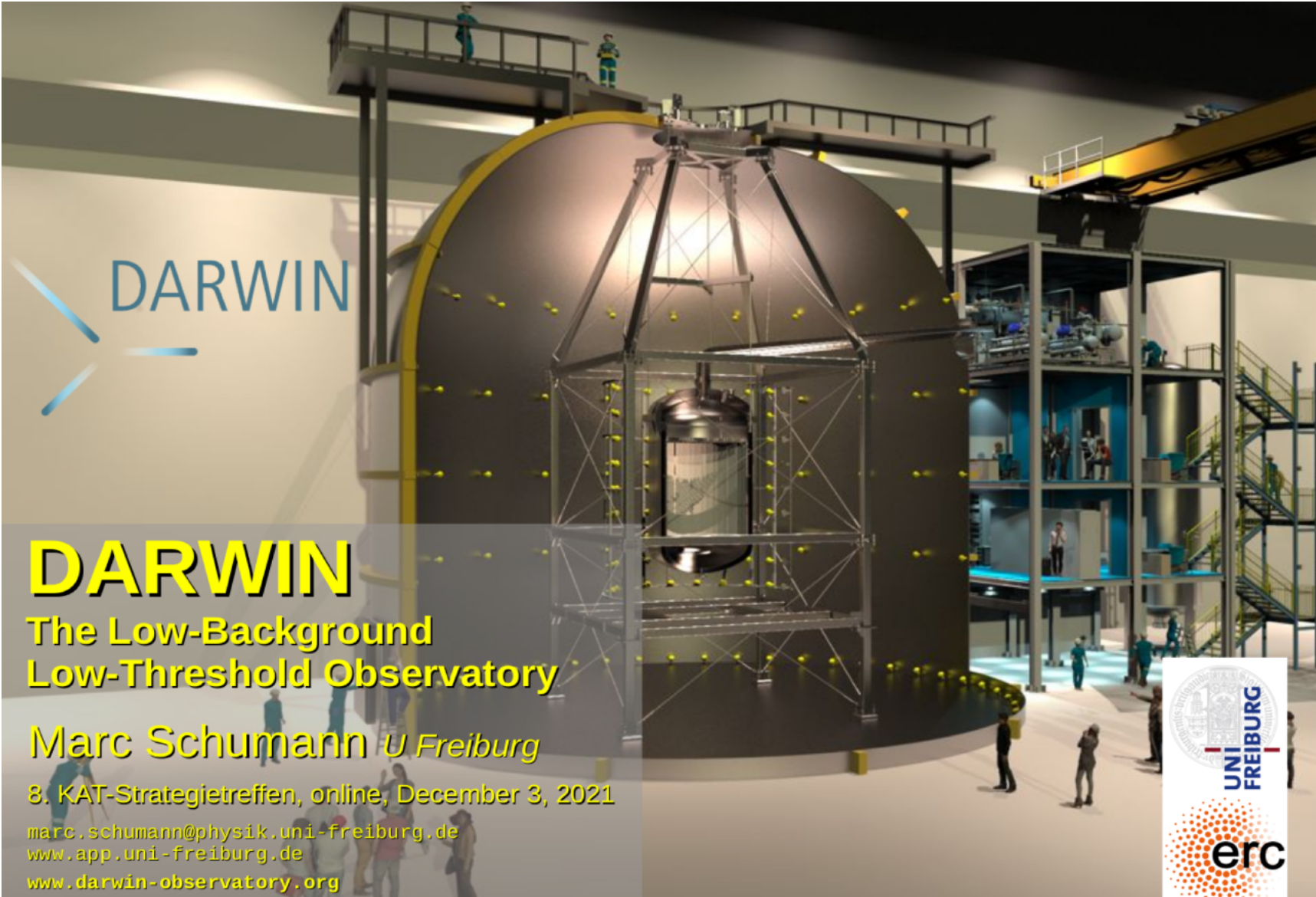
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IceCube-Gen2: The Window to the extreme Universe

- Neutrino astronomy/physics at new sensitivity level and energy range
- IceCube-Upgrade (fully funded, construction 2024/25)
- IceCube-Gen2: In-ice, surface, radio instrumentation
Overall cost: 347M\$ (mostly US, WBS accounting),
Envisaged: 40M€ invest from Germany
- Construction 2026-2033
- Strong push by decadal astronomy review (ASTRO2020)

Marek Kowalski (DFA, Universität Bonn) for the German IceCube and IceCube-Gen2 groups
KAT strategy meeting, Bad Honner (almost) 2021

DARWIN



DARWIN

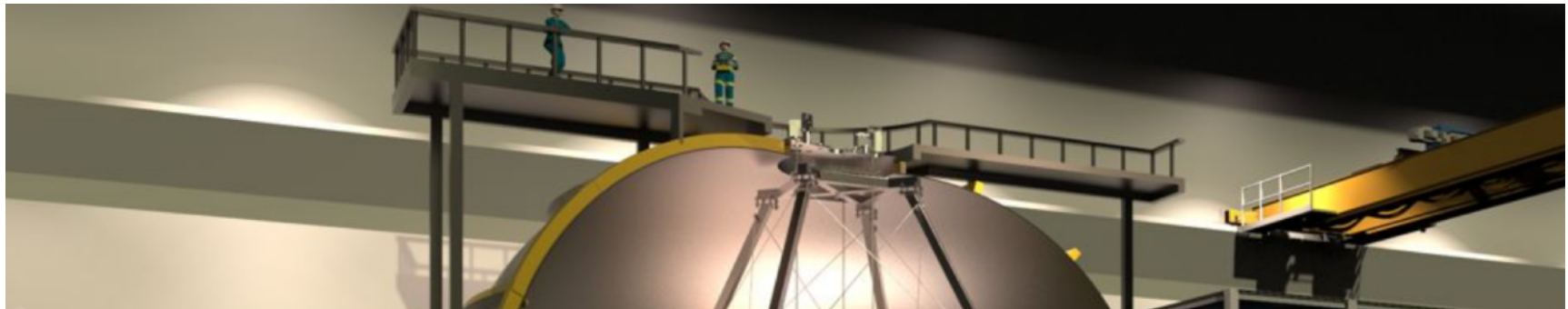
The Low-Background
Low-Threshold Observatory

Marc Schumann *U Freiburg*

8. KAT-Strategietreffen, online, December 3, 2021

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www.app.uni-freiburg.de
www.darwin-observatory.org

DARWIN



- Observatory for rare processes in astroparticle physics
 - “Ultimate” direct Dark Matter search: reaching the neutrino floor
 - Many further science cases from neutrino physics to axion/ALPs, ...
- Building on XENON1T/nT experience
- Many new technical developments, improving sensitivity, substantial German contributions
- Cost: Mainly Xe gas (~100M€; evolving market, gas available for further use after DARWIN lifetime); detector/infrastructure ~20M€
- Plans of future merger with LZ (US) - currently: MoU for joint R&D
- Construction after next BMBF funding period

www.app.uni-freiburg.de
www.darwin-observatory.org



LEGEND-1000

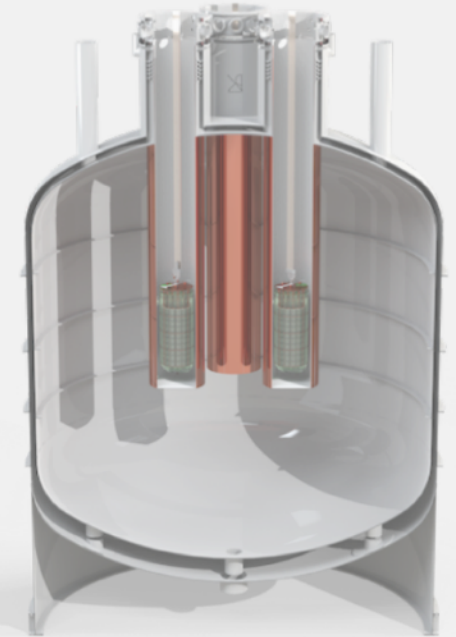
Stefan Schönert for the LEGEND Collaboration

Dec. 2, 2021

KAT Strategy Meeting

LEGEND

Large Enriched
Germanium Experiment
for Neutrinoless $\beta\beta$ Decay



LEGEND-1000

- New sensitivity regime for $0\nu\beta\beta$ searches
- Building on experience from GERDA and LEGEND-200, novel detectors and technology
- Merger with Majorana (US)
- International alignment process:
 - DOE portfolio review (LEGEND-1000 „wins“)
 - $0\nu\beta\beta$ summit, LNGS: Coordinated effort towards 2 ton-scale experiments if European funding committed
- Site: LNGS or SNOLAB
- Timeline: Int. Agreement 2022, start procurement 2023, first deployment 2028 (250 kg Ge)
- Cost: Overall ~120M€, 20-30M€ from Germany

LEGEND-1000

Stefan Schönert, LEGEND-1000

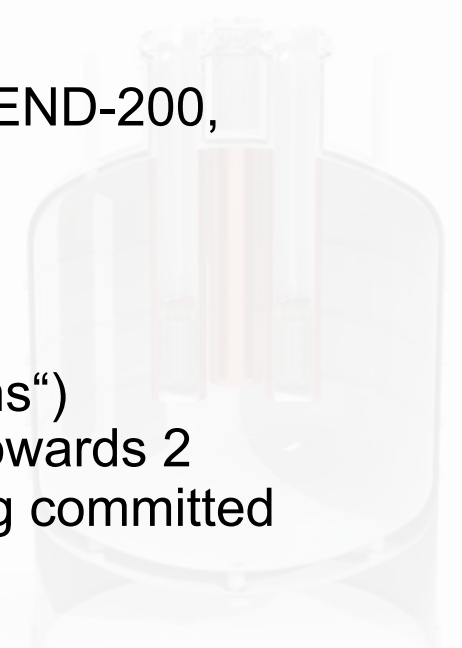
Dec. 2, 2021

KAT Strategy Meeting

Technical University of Munich

TUM

Large Enriched Germanium Experiment for Neutrinoless $\beta\beta$ Decay



Einstein Telescope

Einstein Telescope

„Project“ status



Michèle Heurs
Institut für Gravitationsphysik
Leibniz Universität Hannover

**KAT Strategy Meeting
Bad Honnef
2. December 2021**

Einstein Telescope

Einstein Telescope

„Project“ status



- Astrophysics and multi-messenger studies with gravitational waves
- Overall cost: 1.1/1.7 B€, national shares depend on siting
- Included in ESFRI Roadmap (B, IT, NL, PL, SP)
- Candidate sites: Limburg area, Sardegna, Saxony?
- Timeline: Site decision and construction start 2026, operation 2035
- German coordination established
- Important: Not an initiative from astroparticle physics alone.

KAT Strategy Meeting
Bad Honnef



Michèle Heurs
Institut für Gravitationsphysik
Leibniz Universität Hannover

Deutsches Zentrum für Astrophysik



An initiative of German Astronomy and Astroparticle Physics under the Leadership of Günther Hasinger

Christian Stegmann on behalf of the DZA team

2.12.2021, KAT Strategy Meeting



- Initiative to establish 2 research centres in Saxony as compensation for termination of coal mining
- DZA successfully passed first selection round, 6 competitors left
- Asymptotic: 170M€/year (1200 employees) if successful
→ Far beyond ErUM-Pro scope
- Commonly supported bei KAT and RDS
- 3 pillars: computing, instrumentation, possible ET site
- Science drivers: SKA and ET
- Timeline: Full application April 2022, start construction 2023
- **Question:** Interest in quiet, medium-overburden (~200 m) lab?

Surveys and Roadmaps*

ASTRO2020 US
Decadal Survey

APPEC Roadmap
2017-2026

soliciting [feedback](#) for mid-term
review by Jan. 2022

DOE NP Portfolio
Review 2021

ESFRI Roadmap
Update 2021

Helmholtz
Roadmap 2021+

symposium in June 2021,
rolling process of appl./reviews

Snowmass
Process US particle
physics

BMBF Roadmap
2022+

in preparation

***) an incomplete list!**

Looking forward to exciting research and many new opportunities in the next year(s).

Thank you
and all the best for 2022!

