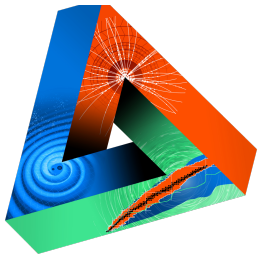
JENAActivities



JENAS activities: http://nupecc.org/jenaa/

New ECFA Chair: karl.jakobs@uni-freiburg.de;

marek.Lewitowicz@ganil.fr second mandate as NuPECC Chair

Venue of the **JENAS 2022** event selected after a call for proposals!

Madrid in April 2022 at CSIC headquarters.

In order to avoid overlaps with the Townmeeting of APPEC we should foresee a date around June-July 2022.

Call for EoIs as result of JENAS 2019. Implemented procedure:

1. Joint APPEC-ECFA-NuPECC task force to cover and support all EoI topics
2. The chairs of APPEC, ECFA and NuPECC organize a kick-off gathering with all EoI proponents and the task force
3. The proponents create dedicated websites for their projects, indicating the JENAS logo and the link to APPEC, ECFA and NuPECC
4. The EoIs coordinators and the related task force members participate to follow-up topical meetings with the objectives to come to a concrete plan (EoI kick-off meetings held in **Aug-Sept. 2020).**
5. A dedicated APPEC-ECFA-NuPECC JENAS website created: **http://nupecc.org/jenaa/**
6. Call for items to be supported on Oct. 14, answers collecte by Dec. 9.

JENAS EoIs

Expressions of Interest for joint activities: 5 EoIs received!

iDMEu (https://indico.cern.ch/event/869195/overview)
Initiative for Dark Matter in Europe and beyond: Towards facilitating communication and result sharing in the Dark Matter community

Gravitational Waves for fundamental physics (https://agenda.infn.it/event/22947/overview)
A cross-cutting initiative for common platform related to GW

MODE (https://userswww.pd.infn.it/~dorigo/MODE.html)
Machine-Learning Optimized Design of Experiments Nuclear Physics at the LHC (https://indico.ph.tum.de/event/4492/)

NuclearPhysics@LHC (https://indico.ph.tum.de/event/4492) A unique doorway to investigate the **hyperon-puzzle in neutron stars** and to enable the search for dark matter in cosmic rays

EDM (https://indico.ph.tum.de/event/4482/) Storage Rings for the Search of Charged-Particle Electric Dipole Moments

All links in http://www.nupecc.org/jenaa/?display=eois

JENAA

JENAS EoI Task Force representatives

For APPEC:

- Jo van den Brandt (2)
- Jürgen Brunner (3)
- Tomek Bulik (2)
- Francesca Calore (1)
- Fiorenza Donato (4)
- Elena Cuoco (3)
- Uwe Oberlack (1)
- Xin Wu (4)

For ECFA:

- Peter Levai (2)
- Isabell Melzer-Pellmann (1)
- Nick van Remortel (2)
- Mike Seidel (5)
- Marek Tasevsky (3)
- Claude Vallee (1)
- Mikko Voutilainen (3)

For NuPECC:

- Navin Alahari (4)
- Franck Sabatié (3)
- Boris Sharkov (1,2)
- Hans Stroeher (5)
- Eberhard Widmann (5)
- György Wolf (2,4)

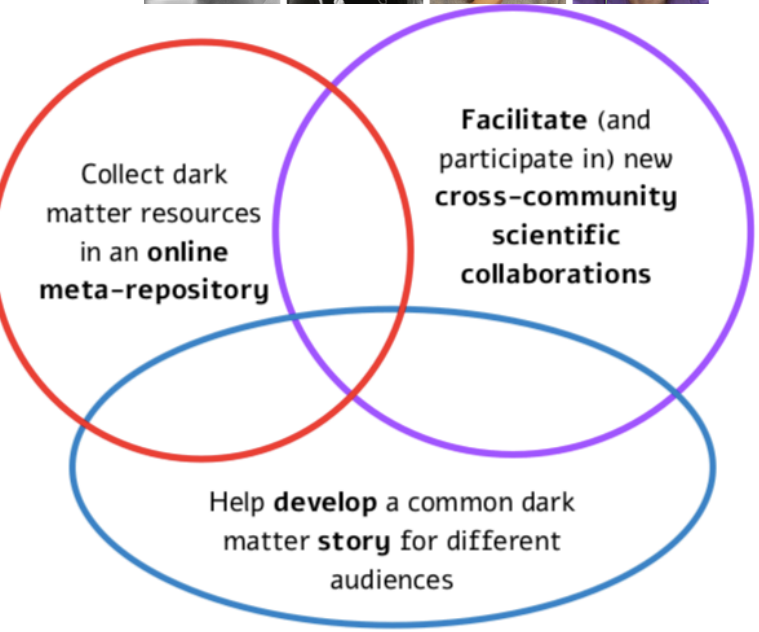
Call for financial support on encouragement EoI activities:

1) Support the organization of gatherings across communities on the EoI topic, e.g. workshops, town meetings, platforms for continuous discussions,…
2) Support the dissemination of the EoI topic, e.g. professional website, publications, outreach projects including city science projects, …
3) Support to foster the cross-disciplinary research enviroents in a sustainable fashion.

EoIs* sponsored by large communities (> 300 people)

iDMEu: *common data exchange platform supported by ESCAPE, develop common test cases, virtual forum across communities to exchange results, synergy with theory, common doc repository, outreach, ...*

M. Cirelli, C. Doglioni, G. Lanfranchi, F. Reindl in APPEC Interviews



EoI: https://indico.cern.ch/event/869195/overview
Kick-off: https://indico.cern.ch/event/954854/

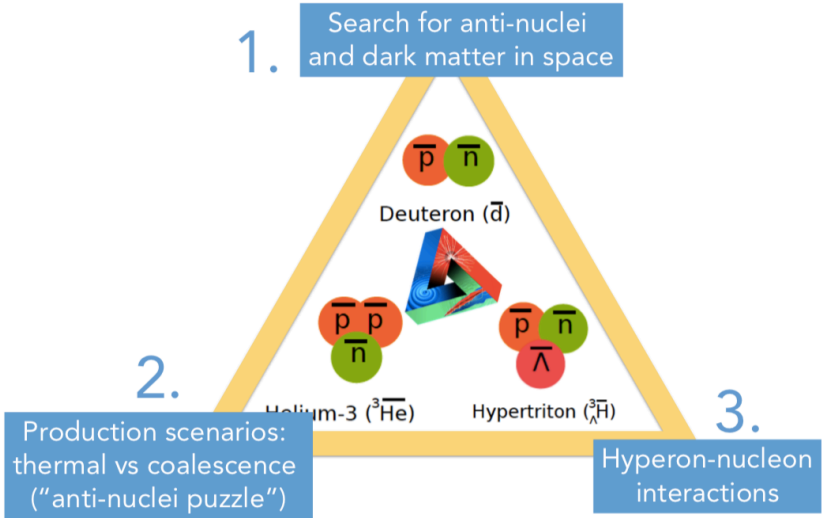
Gravitational wave probes of fundamental physics: exciting science including gravitationally interacting DM and in strong synergy with Nuclear Physics. *Connect nuclear/particle physics/multi-messenger community through workshops, schools (e.g. with EC COST actions, MarieCurie, National Agencies), connecting to Astronomers and Theory/ Experiment.*

T. Galatyuk, P. Pani in APPEC interviews

Kick-off: https://agenda.infn.it/event/22947/timetable/#20200922.detailed
EoI: https://agenda.infn.it/e/GWFundPhys

Nuclei@LHC
Laura Fabietti and A. P. Kalweit

https://indico.cern.ch/event/957183/

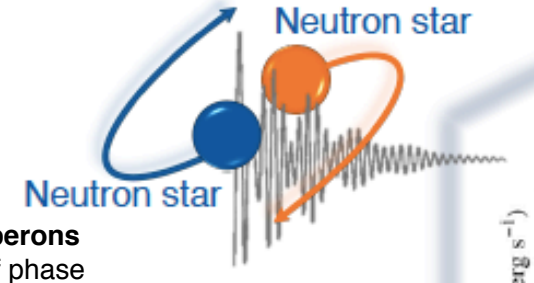


APPEC

Gravitational wave signal depends critically on nuclear equation of state (EoS)

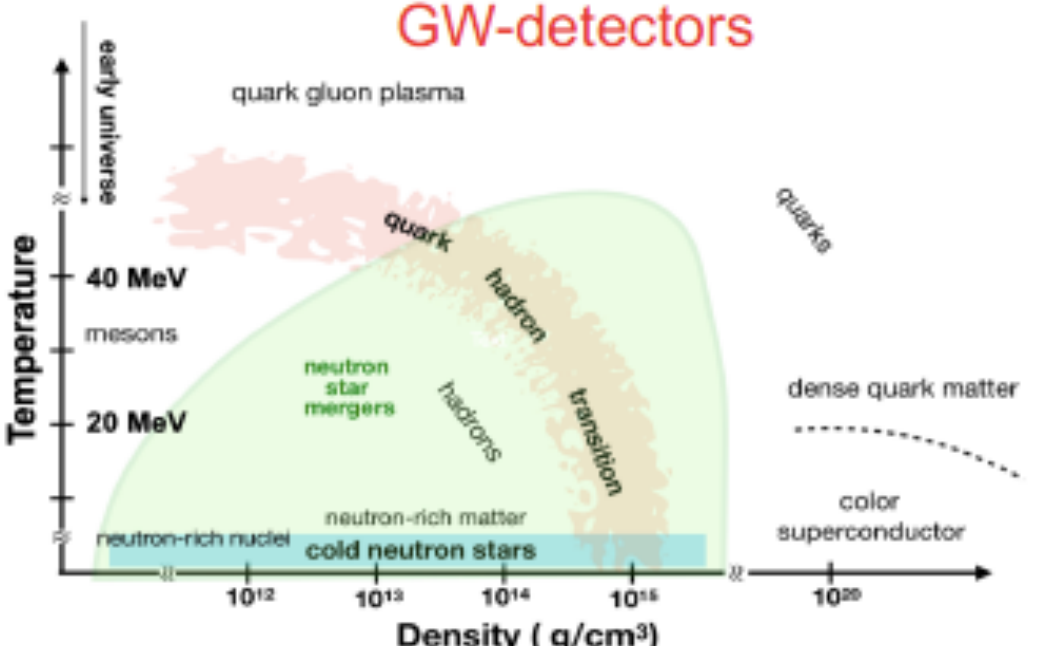
More by Stephan Rosswog

A lot of Synergy with Nuclear Physics!

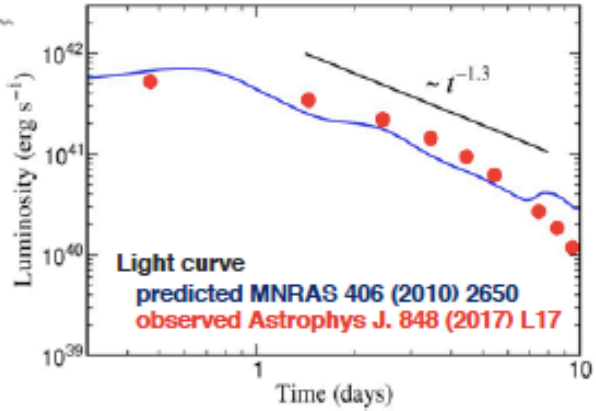


Is there quark matter in neutron stars? **hyperons** or deconfined quark matter? Exploration of phase diagram of QCD

Target of 3rd Generation GW-detectors



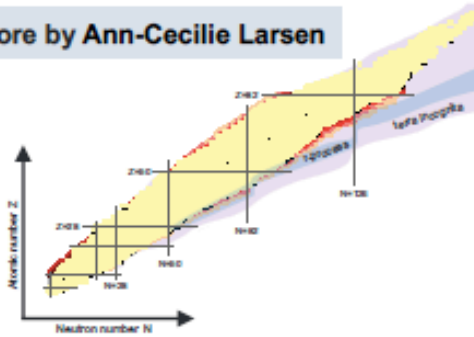
Nuclear, atomic high-energy physics



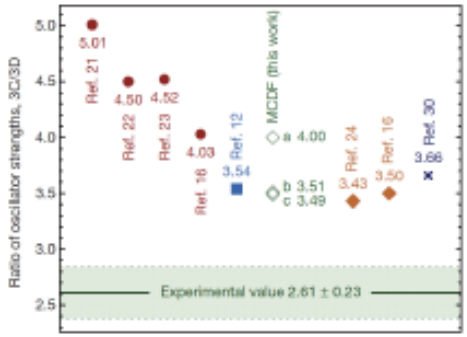
and their role in multi-messenger astronomy

More by Alexander Kalweit, Aleksi Kurkela

More by Ann-Cecilie Larsen



Production of heavy elements in cosmos (driven by nuclear physics r-process)



Spectral lines of highly charged atoms reveals composition in the ejecta (lack of atomic data!)

More by Sven Bernitt

Technology sinergy

GW and European HEP community

LIGO and Virgo are CERN-recognized experiments

MOU between CERN – INFN – Nikhef on instrumentation for Einstein Telescope

Interactions have started on R&D for vacuum instrumentation

Examples for joint R&D on instrumentation

Underground construction

Vacuum beam-tube construction, cleaning & bake out procedure

Cryogenics, controls

ET will adhere to the FAIRness policy on data and the nuclear physics community will have access to ET data;
Openess towards collaborations with the Nuclear Physics community.

Important synergies with FAIR!

Einstein Telescope vacuum system

Three detectors that each consist of two interferometers: 6 ITFs in total

Each ITF has 20 km of main vacuum tube + several km of filter cavities

About 3 * (2 * 30 + 2) ≈ 130 km of vacuum tube of about 1 m diameter (assumption)

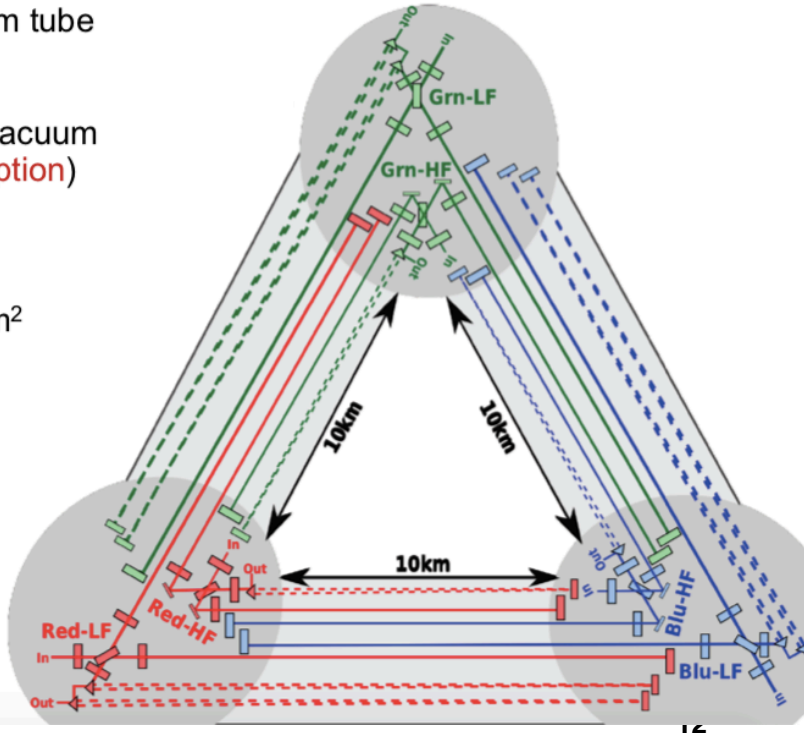
Total volume: about 120,000 m^3

Total surface area: about 420,000 m^2

Target pressure of < 10^{-10} hPa

Hydrocarbon pressure < 10^{-14} hPa

For comparison LHC at CERN:
- **Beam tubes: 2,000 m^3**
- Cryo-magnet insulation: 9,000 m^3
- Cryo distribution line: 5,000 m^3



Jo van den Brandt
https://agenda.infn.it/event/22947/contributions/121326/attachments/75586/96794/GW_Hardware_JENAS_v1_1.pdf

2 Test Science Projects are overlapping with JENAS EoIs! Financed by EOSC03

ESCAPE
European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures

Test Science Projects

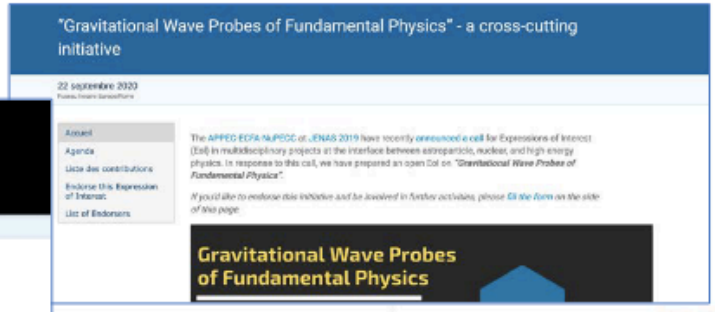
Dark Matter TSP:

- understand the nature of dark matter by collecting data, analysis pipelines and results from complementary astronomy, particle and nuclear physics sources on a broad platform that will be ultimately be hosted on the EOSC Portal.
- exploit synergies and complementarities across different communities, creating a unique link between dark matter as a fundamental science question and the Open Science ESCAPE services needed to answer it.

Extreme Universe & Gravitational waves TSP:

- do 'frontier' multi-messenger science to understand extreme matter and particle processes in strongly curved space-time.
- combine astronomy and e-infrastructures and focus on data organisation
- organise data from different wavelengths/messengers - and different types of extreme astrophysical transients (SNe, GRBs, FRBs, TDEs) - so that they can be easily gathered, analysed and modelled holistically, and not remain fragmented as present.

Linked to two corresponding JENAA EoIs (with already about 1000 subscribed scientists)



Funded by the European Union's Horizon 2020 - Grant N° 824064

Proposals of activities to be supported by APPEC-ECFA-NuPECC

MODE	NPhysics@LHC	DM	GW	EDM
Workshop on Differentiable Programming for Experimental Design (Feb 2021, Luvain or Padova June 2021)	Workshop at CERN or Bologna, end of 2021-beginning of 2022	Travels to kick off and Townmeeting meetings of 2 ECRs; kick-off meeting May 10-12, 2021 4860 € for about 100 participants at CERN; Open access fees for publications	Lobbying at ERC PE2, spread the initiative among stakeholders, RFO, Sponsor topical meetings, professional web sites…	Already financed Workshop on Mach 29-31, 2021 in Bad Honnef
8500 € for about 50 participants	12000 € for about 50 participants	ECRs travels 3360 € Townmwwting 4860 € Open access 2000 €/yr		
Deep learning in muon tomography	Antinuclei fluxes close to Earth and from DM annihilation	- common platform to for cross-community collaborations - DM meta-repository - Engaging audiences.		Measurements of static Electric Dipole Moments (EDM) of fundamental particles. Searches for axions and axion-like particles (ALPs) through oscillating EDM

WG on diversity

Diversity Charter : http://nupecc.org/jenaa/docs/Diversity_Charter_of_APPEC__ECFA__NuPECC-8.pdf

ECFA contact: Patricia Conde Mu..o, nadia.pastrone@cern.ch, NuPECC contact : n.kalantar-nayestanaki@rug.nl)

Virgo, KM3NeT adhered enthusiastically, while US based experiments such as IceCube cannot adhere; A revision from experts on the wording and international regulations on data monitoring is suggested concerning the Survey.

CERN Data Protection Office contacted which clarified doubts and suggested to group small countried / collaborations to ensure complete anonimity

Individual Recognition WG: Key objective is to create a platform for large collaborations to exchange best practicesamong them and across disciplines.

Meetings ongoing with experiments listed in the JENAA page

http://www.nupecc.org/jenaa/?display=recognition