N-PACT Compilation 2017

Norwegian Particle, Astroparticle
and Cosmology Theory community

Introduction

N-PACT is an informal network aimed at all researchers at Norwegian academic institutions (and Norwegians at CERN) working on Theoretical Particle physics, Astroparticle physics, or Cosmology. The founding workshop was 19.-22. June 2017 at the University of Stavanger. The network compiles an annual summary of the combined scientific activity of the network members, and runs an annual workshop and an email list: **npact@uis.no**.

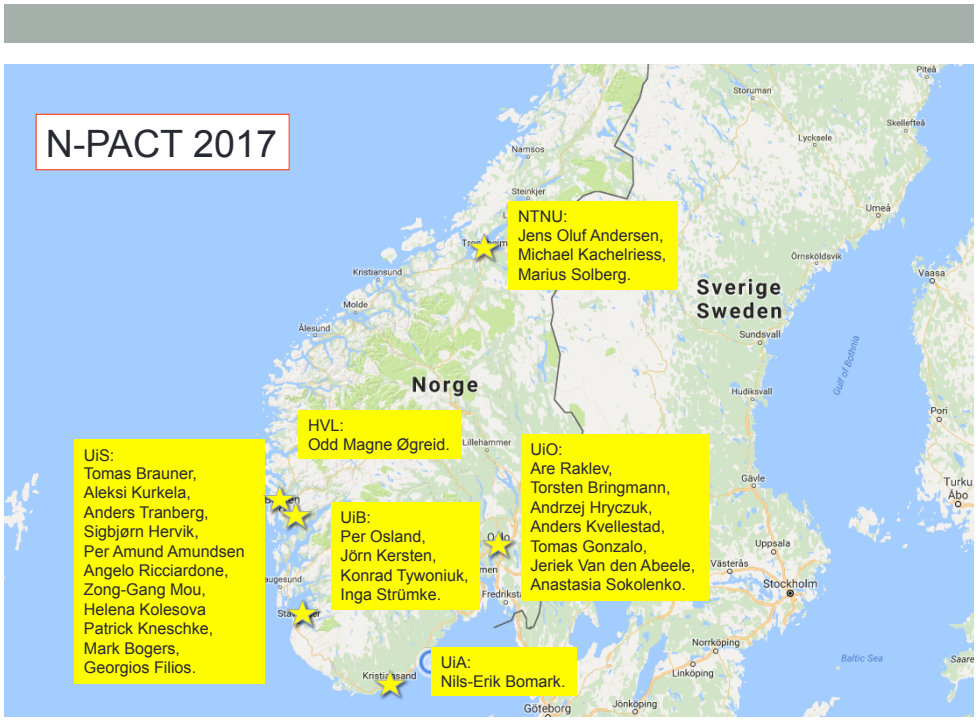


Figure 1: Network members and their affiliations in Norway

Member profiles

University of Agder

Nils-Erik Bomark,
Associate Professor.
At UiA since 2015. SUSY phenomenology, NMSSM, Dark Matter. How to teach particle physics non-technically.

University of Bergen

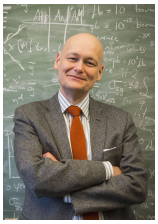
Jörn Kersten,
Professor.
At UiB since 2014. SUSY phenomenology, self-interacting dark matter, physics of the early universe, cosmology, neutrino physics.

Inga Strümke,
Ph.D. student.
At UiB since 2015. Thermal field theory, SUSY-phenomenology, SUSY Dark Matter, Machine Learning.

Per Osland,
Professor (emer.).
At UiB since 1987. Particle phenomenology, Extended Higgs sector, CP violation, Dark Matter.

Konrad Tywoniuk,
Postdoc.
Fellow at CERN since 2015. Heavy-ion physics, hard probes (jet quenching, heavy bosons), finite temperature theory, cosmology.

University of Oslo



Are Raklev,
Professor.
At UiO since 2010. Particle Phenomenology, SUSY, Dark Matter. LHC, CERN, GAMBIT.

Torsten Bringmann,
Professor.
At UiO since 2013. BSM particle physics and cosmology. Astrophysical probes of dark matter: indirect detection and structure formation. DarkSUSY, GAMBIT, CTA.

Andrzej Hryczuk,
Postdoc.
At UiO since (December) 2015. Dark matter in the early and present-day Universe, physics beyond the Standard Model, finite temperature field theory.

Tomas Gonzalo,
Postdoc.
At UiO since 2015. Physics Beyond the SM, Model Building, GUTs, SUSY, Inflation, Neutrino Models. GAMBIT.

Anastasia Sokolenko,
Ph.D. student.
At UiO since 2016.

Anders Kvellestad,
Postdoc.
At UiO/Imperial College since 2017. BSM global fits, LHC phenomenology, supersymmetry, two-Higgs-doublet models, machine learning and Bayesian methods. GAMBIT.

Jeriek Van den Abeele,
Ph.D. student.
At UiO. Astroparticle physics, Dark Matter.

University of Stavanger

Anders Tranberg,
Professor.
At UiS since 2013. Finite temperature and out-of-equilibrium field theory, cosmology, baryogenesis, inflation and gravitational waves. CERN, LISA.

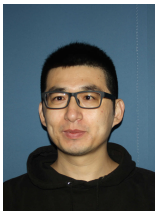
Sigbjørn Hervik,
Professor.
At UiS since 2009. GR, Modified Gravity, Differential Geometry.

Aleksi Kurkela,
Associate Professor.
At UiS/CERN since 2014. Heavy-ion collisions, QCD at finite temperature, density. Compact stars. LHC, CERN.

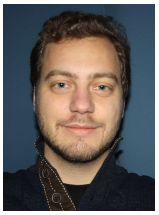
Tomas Brauner,
Professor.
At UiS since 2015. Finite-temperature and -density field theory, phase diagram of QCD, effective field theory, spontaneous symmetry breaking.

Per Amund Amundsen,
Professor.
At UiS since 1989. Theoretical Physics.

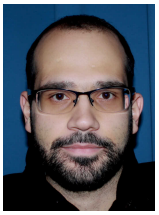
Angelo Ricciardone,
Postdoc.
At UiS 2014-2017. Gravitational waves, modified gravity, inflation.



Zong-Gang Mou,
Postdoc.
At UiS since 2016. Bayogenesis, non-equilibrium field theory, numerical simulations.



Mark Bogers,
Ph.D. student.
At UiS since 2015. Symmetry breaking in quantum field theory.



Georgios Filios, Ph.D. student.
At UiS since 2018. Effective Field Theory, phases of QCD.

Helena Kolesova,
Postdoc.
At UiS since 2018. Finite-temperature field theory, symmetry breaking.

Patrick Kneschke,
Ph.D. student.
At UiS since 2016. QCD at finite temperature, density, magnetic field. 2HDM.

NTNU, Trondheim

Jens Oluf Andersen,
Professor.
At NTNU since 2005. QCD at finite temperature and density: Quark-gluon plasma, finite-density QCD and quark matter, phase transitions.

Marius Solberg,
Associate Professor.
At NTNU since 2016. Works on N-Higgs doublet models, quantum field theory, particle phenomenology.

Michael Kachelriess,
Professor.
At NTNU since 2005. High energy astrophysics, dark matter, neutrino physics.

HVL, Vestlandet

Odd Magne Øgreid,
Associate Professor.
At HVL since 1999. Works on particle phenomenology, extended Higgs sector, CP-violation.

Combined publication list

Metrics:

- 42 peer reviewed journal publication, published during 2017.
- 63 publication points, using new formula,

$$\sum \left[\sqrt{\frac{\text{Authors/affiliations in NPACT}}{\text{All authors/affiliations}}} \times \text{If International} \times \text{Publication level score} \right]$$

where: *If International* is 1 if all authors are Norwegian, 1.3 otherwise; *Publication level score* is either 1 or 3, depending on the journal; *Authors/affiliations* count author/affiliation combinations (a single author with two affiliations counts twice); and where *All authors/affiliations* for a single publication is capped at 10 (for instance for GAMBIT).

References

[1] P. Osland, A. A. Pankov and A. V. Tsytrinov, *Probing Z-Z' mixing with ATLAS and CMS resonant di boson production data at the LHC at $\sqrt{s} = 13$ TeV,* Phys. Rev. D **96** (2017) no.5, 055040 doi:10.1103/PhysRevD.96.055040 [arXiv:1707.02717 [hep-ph]].

[2] S. Hervik, V. Pravda and A. Pravdova, *Universal spacetimes in four dimensions,* JHEP **1710** (2017) 028 doi:10.1007/JHEP10(2017)028 [arXiv:1707.00264 [gr-qc]].

[3] M. Deak, K. Kutak and K. Tywoniuk, *Towards tomography of quark-gluon plasma using double inclusive forward-central jets in Pb-Pb collision,* Eur. Phys. J. C **77** (2017) no.11, 793 doi:10.1140/epjc/s10052-017-5358-8 [arXiv:1706.08434 [hep-ph]].

[4] T. Binder, T. Bringmann, M. Gustafsson and A. Hryczuk, *Early kinetic decoupling of dark matter: when the standard way of calculating the thermal relic density fails,* Phys. Rev. D **96** (2017) no.11, 115010 doi:10.1103/PhysRevD.96.115010 [arXiv:1706.07433 [astro-ph.CO]].

[5] T. Brauner and C. P. Hofmann, *Two-loop free energy of three-dimensional antiferromagnets in external magnetic and staggered fields,* Annals Phys. **386** (2017) 178 doi:10.1016/j.aop.2017.08.030 [arXiv:1706.04538 [cond-mat.str-el]].

[6] T. Brauner and S. V. Kadam, *Anomalous low-temperature thermodynamics of QCD in strong magnetic fields,* JHEP **1711** (2017) 103 doi:10.1007/JHEP11(2017)103 [arXiv:1706.04514 [hep-ph]].

[7] F. U. Bernlochner *et al.* [The GAMBIT Flavour Workgroup], *FlavBit: A GAMBIT module for computing flavour observables and likelihoods,* Eur. Phys. J. C **77** (2017) no.11, 786 doi:10.1140/epjc/s10052-017-5157-2 [arXiv:1705.07933 [hep-ph]].

[8] C. Balazs *et al.* [GAMBIT Collaboration], *ColliderBit: a GAMBIT module for the calculation of high-energy collider observables and likelihoods,* Eur. Phys. J. C **77** (2017) no.11, 795 doi:10.1140/epjc/s10052-017-5285-8 [arXiv:1705.07919 [hep-ph]].

[9] P. Athron *et al.* [GAMBIT Collaboration], *Global fits of GUT-scale SUSY models with GAMBIT,* Eur. Phys. J. C **77** (2017) no.12, 824 doi:10.1140/epjc/s10052-017-5167-0 [arXiv:1705.07935 [hep-ph]].

[10] P. Athron *et al.* [GAMBIT Collaboration], *Status of the scalar singlet dark matter model,* Eur. Phys. J. C **77** (2017) no.8, 568 doi:10.1140/epjc/s10052-017-5113-1 [arXiv:1705.07931 [hep-ph]].

[11] T. Bringmann *et al.* [The GAMBIT Dark Matter Workgroup], *DarkBit: A GAMBIT module for computing dark matter observables and likelihoods,* Eur. Phys. J. C **77** (2017) no.12, 831 doi:10.1140/epjc/s10052-017-5155-4 [arXiv:1705.07920 [hep-ph]].

[12] P. Athron *et al.* [GAMBIT Collaboration], *A global fit of the MSSM with GAMBIT,* Eur. Phys. J. C **77** (2017) no.12, 879 doi:10.1140/epjc/s10052-017-5196-8 [arXiv:1705.07917 [hep-ph]].

[13] P. Athron *et al.* [GAMBIT Collaboration], *GAMBIT: The Global and Modular Beyond-the-Standard-Model Inference Tool,* Eur. Phys. J. C **77** (2017) no.11, 784 doi:10.1140/epjc/s10052-017-5321-8 [arXiv:1705.07908 [hep-ph]].

[14] F. F. Deppisch, T. E. Gonzalo and L. Graf, Phys. Rev. D **96** (2017) no.5, 055003 doi:10.1103/PhysRevD.96.055003 [arXiv:1705.05416 [hep-ph]].

[15] T. Bringmann, F. Calore, A. Galea and M. Garny, *Electroweak and Higgs Boson Internal Bremsstrahlung: General considerations for Majorana dark matter annihilation and application to MSSM neutralinos,* JHEP **1709** (2017) 041 doi:10.1007/JHEP09(2017)041 [arXiv:1705.03466 [hep-ph]].

[16] Z. G. Mou, P. M. Saffin and A. Tranberg, *Simulations of Cold Electroweak Baryogenesis: Hypercharge U(1) and the creation of helical magnetic fields,* JHEP **1706** (2017) 075 doi:10.1007/JHEP06(2017)075 [arXiv:1704.08888 [hep-ph]].

[17] M. Kachelriess, O. Kalashev, S. Ostapchenko and D. V. Semikoz, *Minimal model for extragalactic cosmic rays and neutrinos,* Phys. Rev. D **96** (2017) no.8, 083006 doi:10.1103/PhysRevD.96.083006 [arXiv:1704.06893 [astro-ph.HE]].

[18] M. J. Boschini *et al.*, *Solution of heliospheric propagation: unveiling the local interstellar spectra of cosmic ray species,* Astrophys. J. **840** (2017) no.2, 115 doi:10.3847/1538-4357/aa6e4f [arXiv:1704.06337 [astro-ph.HE]].

[19] Z. G. Mou, P. M. Saffin, P. Tognarelli and A. Tranberg, *Simulations of "tunnelling of the 3rd kind",* JHEP **1707** (2017) 015 doi:10.1007/JHEP07(2017)015 [arXiv:1703.08375 [hep-ph]].

[20] C. Helleland and S. Hervik, *Wick rotations and real GIT,* J. Geom. Phys. **123** (2018) 343 doi:10.1016/j.geomphys.2017.09.009 [arXiv:1703.04576 [math.DG]].

[21] Z. G. Mou, P. M. Saffin and A. Tranberg, *Simulations of Cold Electroweak Baryogenesis: Finding the optimal quench time,* JHEP **1707** (2017) 010 doi:10.1007/JHEP07(2017)010 [arXiv:1703.01781 [hep-ph]].

[22] A. L. Melott, B. C. Thomas, M. Kachelriess, D. V. Semikoz and A. C. Overholt, *A supernova at 50 pc: Effects on the Earth's atmosphere and biota,* Astrophys. J. **840** (2017) no.2, 105 doi:10.3847/1538-4357/aa6c57 [arXiv:1702.04365 [astro-ph.EP]].

[23] P. Adhikari, J. O. Andersen and P. Kneschke, *Inhomogeneous chiral condensate in the quark-meson model,* Phys. Rev. D **96** (2017) no.1, 016013 doi:10.1103/PhysRevD.96.016013 [arXiv:1702.01324 [hep-ph]].

[24] T. Brauner and S. Kadam, *Anomalous electrodynamics of neutral pion matter in strong magnetic fields,* JHEP **1703** (2017) 015 doi:10.1007/JHEP03(2017)015 [arXiv:1701.06793 [hep-ph]].

[25] O. M. Ogreid, P. Osland and M. N. Rebelo, *A Simple Method to detect spontaneous CP Violation in multi-Higgs models,* JHEP **1708** (2017) 005 doi:10.1007/JHEP08(2017)005 [arXiv:1701.04768 [hep-ph]].

[26] J. Heisig, J. Kersten, N. Murphy and I. Str§mke, *Trilinear-Augmented Gaugino Mediation,* JHEP **1705** (2017) 003 doi:10.1007/JHEP05(2017)003 [arXiv:1701.02313 [hep-ph]].

[27] P. Adhikari, J. O. Andersen and P. Kneschke, *On-shell parameter fixing in the quark-meson model,* Phys. Rev. D **95** (2017) no.3, 036017 doi:10.1103/PhysRevD.95.036017 [arXiv:1612.03668 [hep-ph]].

[28] T. Bringmann, F. Kahlhoefer, K. Schmidt-Hoberg and P. Walia, *Strong constraints on self-interacting dark matter with light mediators,* Phys. Rev. Lett. **118** (2017) no.14, 141802 doi:10.1103/PhysRevLett.118.141802 [arXiv:1612.00845 [hep-ph]].

[29] A. Ricciardone and G. Tasinato, *Primordial gravitational waves in supersolid inflation,* Phys. Rev. D **96** (2017) no.2, 023508 doi:10.1103/PhysRevD.96.023508 [arXiv:1611.04516 [astro-ph.CO]].

[30] M. Beneke, A. Bharucha, A. Hryczuk, S. Recksiegel and P. Ruiz-Femenia, *The last refuge of mixed wino-Higgsino dark matter,* JHEP **1701** (2017) 002 doi:10.1007/JHEP01(2017)002 [arXiv:1611.00804 [hep-ph]].

[31] Y. Mehtar-Tani and K. Tywoniuk, *Groomed jets in heavy-ion collisions: sensitivity to medium-induced bremsstrahlung,* JHEP **1704** (2017) 125 doi:10.1007/JHEP04(2017)125 [arXiv:1610.08930 [hep-ph]].

[32] T. Bringmann, A. Galea, A. Hryczuk and C. Weniger, *Novel Spectral Features in MeV Gamma Rays from Dark Matter,* Phys. Rev. D **95** (2017) no.4, 043002 doi:10.1103/PhysRevD.95.043002 [arXiv:1610.04613 [hep-ph]].

[33] P. Adhikari and J. O. Andersen, *Chiral density wave versus pion condensation in the 1+1 dimensional NJL model,* Phys. Rev. D **95** (2017) no.5, 054020 doi:10.1103/PhysRevD.95.054020 [arXiv:1610.01647 [hep-th]].

[34] T. E. Gonzalo, L. Heurtier and A. Moursy, JHEP **1706** (2017) 109 doi:10.1007/JHEP06(2017)109 [arXiv:1609.09396 [hep-th]].

[35] T. Brauner, T. V. I. Tenkanen, A. Tranberg, A. Vuorinen and D. J. Weir, *Dimensional reduction of the Standard Model coupled to a new singlet scalar field,* JHEP **1703** (2017) 007 doi:10.1007/JHEP03(2017)007 [arXiv:1609.06230 [hep-ph]].

[36] R. Aggleton, D. Barducci, N. E. Bomark, S. Moretti and C. Shepherd-Themistocleous, *Review of LHC experimental results on low mass bosons in multi Higgs models,* JHEP **1702** (2017) 035 doi:10.1007/JHEP02(2017)035 [arXiv:1609.06089 [hep-ph]].

[37] T. Brauner and N. Yamamoto, *Chiral Soliton Lattice and Charged Pion Condensation in Strong Magnetic Fields,* JHEP **1704** (2017) 132 doi:10.1007/JHEP04(2017)132 [arXiv:1609.05213 [hep-ph]].

[38] I. Ghisoiu, T. Gorda, A. Kurkela, P. Romatschke, M. Säppi and A. Vuorinen, *On high-order perturbative calculations at finite density,* Nucl. Phys. B **915** (2017) 102 doi:10.1016/j.nuclphysb.2016.11.023 [arXiv:1609.04339 [hep-ph]].

[39] M. Herranen, A. Hohenegger, A. Osland and A. Tranberg, *Quantum corrections to inflation: the importance of RG-running and choosing the optimal RG-scale,* Phys. Rev. D **95** (2017) no.2, 023525 doi:10.1103/PhysRevD.95.023525 [arXiv:1608.08906 [hep-ph]].

[40] P. Adhikari and J. O. Andersen, *Consistent regularization and renormalization in models with inhomogeneous phases,* Phys. Rev. D **95** (2017) no.3, 036009 doi:10.1103/PhysRevD.95.036009 [arXiv:1608.01097 [hep-ph]].

[41] A. G. Akeroyd *et al.*, *Prospects for charged Higgs searches at the LHC,* Eur. Phys. J. C **77** (2017) no.5, 276 doi:10.1140/epjc/s10052-017-4829-2 [arXiv:1607.01320 [hep-ph]].

[42] B. Grzadkowski, O. M. Ogreid and P. Osland, *CP-Violation in the ZZZ and ZWW vertices at e^+e^- colliders in Two-Higgs-Doublet Models,* JHEP **1605** (2016) 025 Erratum: [JHEP **1711** (2017) 002] doi:10.1007/JHEP05(2016)025, 10.1007/JHEP11(2017)002 [arXiv:1603.01388 [hep-ph]].