



Heavy-ion physics at CNR

Michael Strickland

Center for Nuclear Research

Heavy-ion experiment

Declan Keane and Spiros Margetis study nucleus-nucleus collisions using the STAR detector located at Brookhaven National Laboratory.

- Quark-gluon plasma (QGP) collective dynamics
- Hypernuclei production
- Mapping the QGP phase diagram
- Heavy quarks in the QGP



Research group:

- Declan F. Keane (Professor)
- Spyridon Margetis (Professor, Leave @ DOE)
- Sooraj Radhakrishnan (Research Scientist)
- Ashik Sheikh (Postdoc)
- Tommy Tsang (Postdoc)
- Emmy Duckworth (PhD student)
- Yue Liang (PhD student)

Heavy-ion experiment

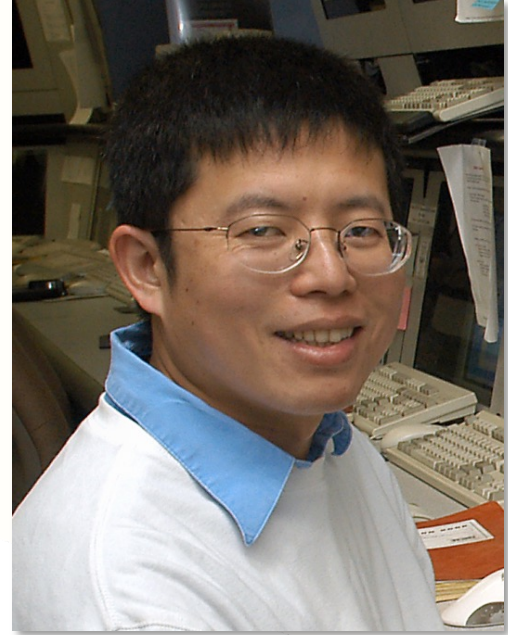
Coming soon!



Lebron James

Heavy-ion experiment

Coming soon!



Zhangbu Xu

Top three experimental papers in the last decade

Global Λ hyperon polarization in nuclear collisions: evidence for the most vortical fluid #1

STAR Collaboration · L. Adamczyk (AGH-UST, Cracow) et al. (Jan 23, 2017)


Published in: *Nature* 548 (2017) 62-65 · e-Print: [1701.06657](#) [nucl-ex]

 pdf  DOI  cite  datasets  reference search  674 citations

Energy Dependence of Moments of Net-proton Multiplicity Distributions at RHIC #2

STAR Collaboration · L. Adamczyk (AGH-UST, Cracow) et al. (Sep 22, 2013)

Published in: *Phys.Rev.Lett.* 112 (2014) 032302 · e-Print: [1309.5681](#) [nucl-ex]

 pdf  DOI  cite  datasets  reference search  548 citations

Bulk Properties of the Medium Produced in Relativistic Heavy-Ion Collisions from the Beam #3

Energy Scan Program

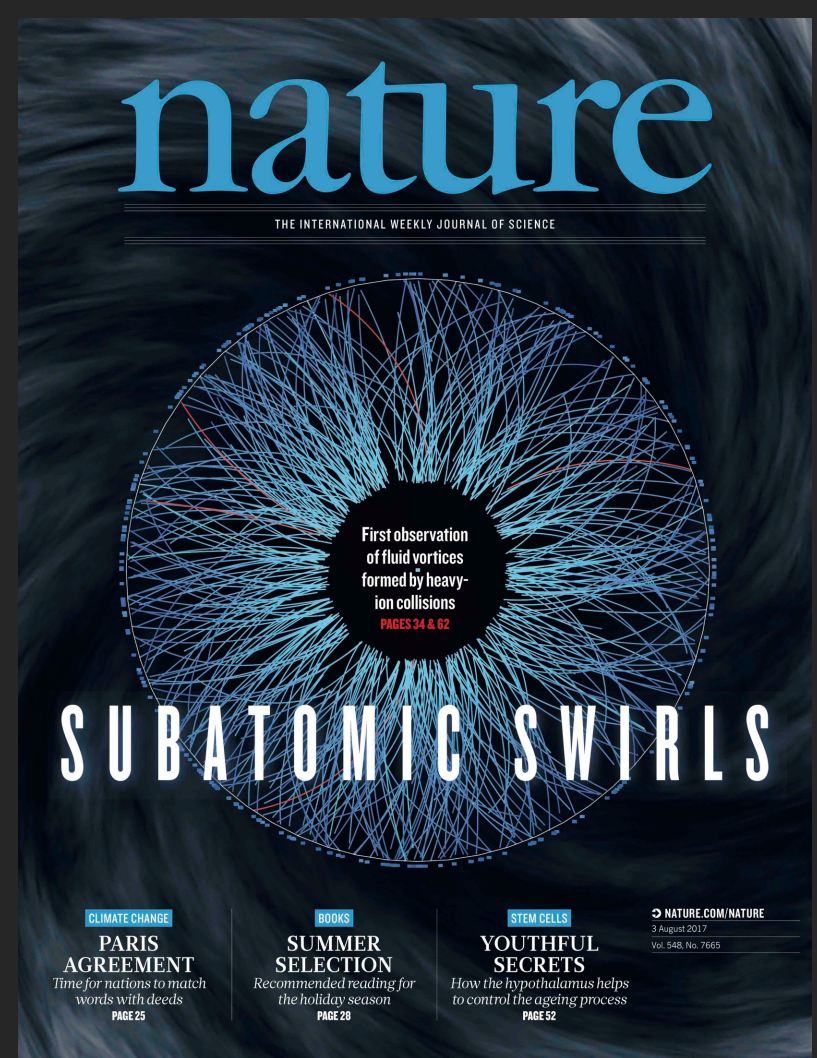
STAR Collaboration · L. Adamczyk (AGH-UST, Cracow) et al. (Jan 24, 2017)

Published in: *Phys.Rev.C* 96 (2017) 4, 044904 · e-Print: [1701.07065](#) [nucl-ex]

 pdf  links  DOI  cite  datasets  reference search  544 citations

Heavy-ion physics makes into Nature!

- The most perfect fluid becomes also the most vortical fluid!
- Theorists still struggling to fully understand these groundbreaking results.



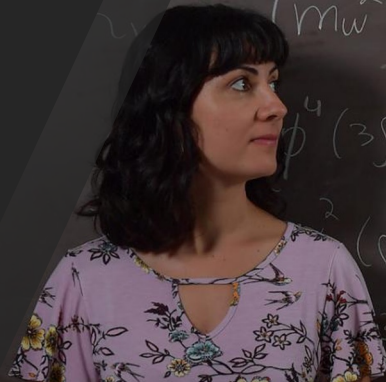
Astrophysics theory

Veronica Dexheimer (**CNR Director**) specializes in the study of dense and hot matter in compact stars.

- Properties of white dwarfs, neutron stars, proto-neutron stars, and stellar mergers.
- Effects of extremely large magnetic fields and the formation of exotic particles, such as hyperons and deconfined quarks.

Research group:

- Veronica Dexheimer (Associate Professor)
- Rajesh Kumar (Postdoc)
- Mateus Pelicer (Postdoc)
- Jeffrey Peterson (Adjunct Professor)
- Krishna Aryal (PhD student)
- Alex Clevinger (PhD student)
- Rafael Jacobsen (PhD student)
- Yuhan Wang (PhD student)
- Connor Brown (Undergraduate student)





Top three astrophysics papers in the last decade

Signatures of quark-hadron phase transitions in general-relativistic neutron-star mergers #1

[Elias R. Most](#) (Frankfurt U.), [L. Jens Papenfort](#) (Frankfurt U.), [Veronica Dexheimer](#) (Kent State U.), [Matthias Hanauske](#) (Frankfurt U. and Frankfurt U., FIAS), [Stefan Schramm](#) (Indiana U.) et al. (Jul 10, 2018)

Published in: *Phys.Rev.Lett.* 122 (2019) 6, 061101 • e-Print: [1807.03684](#) [astro-ph.HE]

 pdf  DOI  cite



 reference search  309 citations

GW190814 as a massive rapidly rotating neutron star with exotic degrees of freedom #2

[V. Dexheimer](#) (Kent State U.), [R.O. Gomes](#) (Frankfurt U., FIAS), [T. Klähn](#) (Cal State, Long Beach), [S. Han](#) (UC, Berkeley and Ohio U.), [M. Salinas](#) (Cal State, Long Beach) (Jul 16, 2020)

Published in: *Phys.Rev.C* 103 (2021) 2, 025808 • e-Print: [2007.08493](#) [astro-ph.HE]

 pdf  DOI  cite

 reference search  110 citations

Noncongruence of the nuclear liquid-gas and deconfinement phase transitions #3

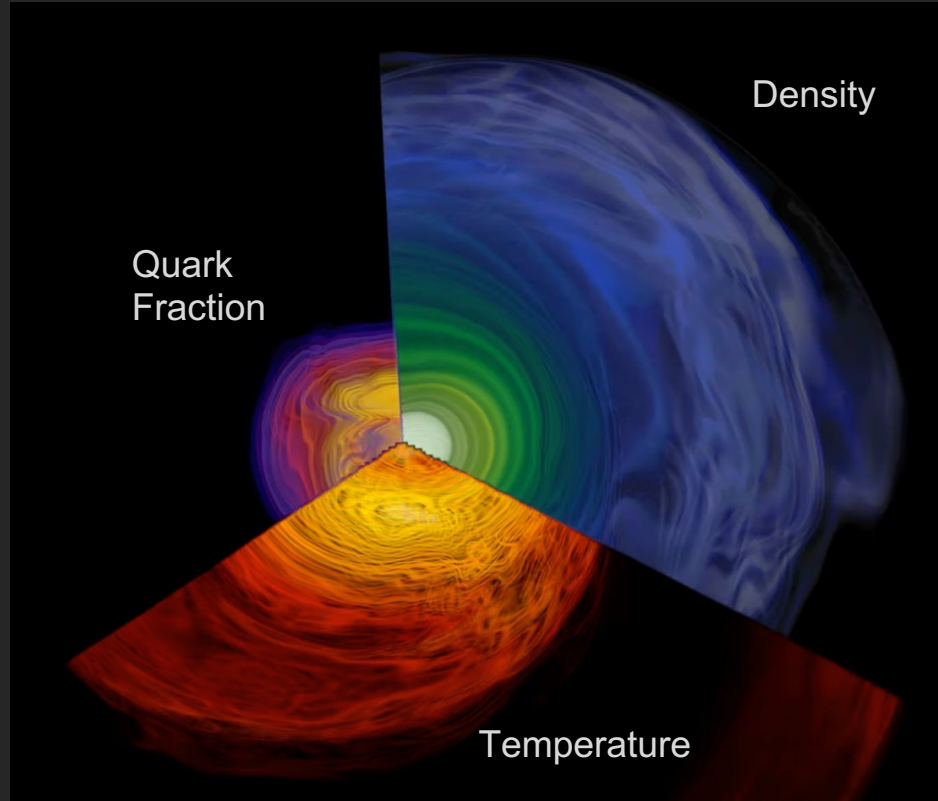
[Matthias Hempel](#) (Basel U.), [Veronica Dexheimer](#) (Kent State U.), [Stefan Schramm](#) (Frankfurt U., FIAS), [Igor Iosilevskiy](#) (Moscow, Inst. High Temp. and Moscow, MIPT) (Feb 12, 2013)

Published in: *Phys.Rev.C* 88 (2013) 1, 014906 • e-Print: [1302.2835](#) [nucl-th]

 pdf  DOI  cite

 reference search  81 citations

Deconfinement to quark matter in a neutron star merger



√√√

Nuclear and particle theory

Mike Strickland's primary interest is the physics of the QGP.

- Resummed QCD equation of state at finite temperature and density (HTLpt)
- QGP collective modes
- Far-from-equilibrium hydrodynamics (aHydro)
- QGP thermalization/hydrodynamization
- Bottomonium suppression
- Electromagnetic emission



Research group:

- Michael Strickland (Professor and Chair)
- Huda Alalawi (PhD Student)
- Jacob Boyd (PhD Student)
- Ajaharul Islam (PhD Student)
- Ubaid Tantary (PhD Student)
- Sabin Thapa (PhD Student)

Nuclear and particle theory

Coming soon, part II



Faculty Tenure Track

Kent State U. (main) · North America

hep-ph nucl-th hep-th Junior (leads to Senior)

🕒 **Deadline on Dec 31, 2023**

Job description:

The Department of Physics at Kent State University invites applications for a tenure-track position in theoretical high-energy nuclear physics at the rank of assistant professor. The position is a bridge position associated with the DOE-funded HEFTY Topical Theory Collaboration and hence the ideal candidate is expected to have expertise in heavy-quark physics. This may include, for example, heavy-quark effective field theories, heavy-quark phenomenology, quarkonium studies at zero or finite temperature, and/or lattice QCD with applications to heavy-quark physics. The successful candidate is expected to be a part of the Kent State Center for Nuclear Research (CNR), teach effectively at both the undergraduate and graduate levels, and to initiate an independent and active externally funded research program. A PhD or equivalent in physics is required along with an established record of research in the targeted topical area.

Applicants should submit materials that include a cover letter, CV, a statement of both immediate-term and long-term research interests, an outline of teaching philosophy, and a diversity statement. Names and contact information for at least three professional references should also be provided. Review of applications will begin in January 2024 and will continue until the position is filled. The appointment is expected to begin in August 2024.

Kent State University is committed to the pursuit and cultivation of diversity and excellence in its student body, staff, and faculty. Kent State University is an R1 university and, therefore, among the top tier of research universities in the US. It is located in Kent, Ohio which is a friendly, safe, international college town nestled in the Cuyahoga River valley. Kent is less than 50 miles from Cleveland, 20 miles from Akron, and 10 miles from the Cuyahoga Valley National Park and offers an outstanding quality of life. Kent State University offers a comprehensive package of benefits.

Inquiries relating to this position may be emailed to nuclearesearch@kent.edu

For a complete description of this position and to apply online, visit our jobsite at <https://jobs.kent.edu>

Equal Opportunity / Affirmative Action Employer / Disabled / Veterans

Contact: Dexheimer, Veronica (nuclearesearch@kent.edu)

Letters of Reference should be sent to: <https://jobslist.kent.edu/cw/en-us/job/499905/faculty-tenure-track9-mo>

More information: <https://jobslist.kent.edu/cw/en-us/job/499905/faculty-tenure-track9-mo>

Posted a month ago, updated 20 days ago

Top three heavy-ion theory papers in the last decade

Heavy-flavour and quarkonium production in the LHC era: from proton–proton to heavy-ion collisions #1

[A. Andronic](#) (Darmstadt, EMMI), [F. Arleo](#) (Ecole Polytechnique and [Annecy, LAPTH](#)), [R. Arnaldi](#) (INFN, Turin), [A. Beraudo](#) (INFN, Turin), [E. Bruna](#) (INFN, Turin) et al. (Jun 12, 2015)

Published in: *Eur.Phys.J.C* 76 (2016) 3, 107 • e-Print: [1506.03981](#) [nucl-ex]



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reference search



622 citations

Three-loop HTLpt thermodynamics at finite temperature and chemical potential #3

[Najmul Haque](#) (Saha Inst.), [Aritra Bandyopadhyay](#) (Saha Inst.), [Jens O. Andersen](#) (Norwegian U. Sci. Tech.), [Munshi G. Mustafa](#) (Saha Inst.), [Michael Strickland](#) (Kent State U.) et al. (Feb 27, 2014)

Published in: *JHEP* 05 (2014) 027 • e-Print: [1402.6907](#) [hep-ph]



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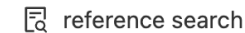
DOI



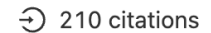
cite



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reference search



210 citations

Testing viscous and anisotropic hydrodynamics in an exactly solvable case #4

[Wojciech Florkowski](#) (Jan Kochanowski U. and [Cracow, INP](#)), [Radoslaw Ryblewski](#) (Cracow, INP), [Michael Strickland](#) (Kent State U. and [Frankfurt U., FIAS](#)) (May 30, 2013)

Published in: *Phys.Rev.C* 88 (2013) 024903 • e-Print: [1305.7234](#) [nucl-th]



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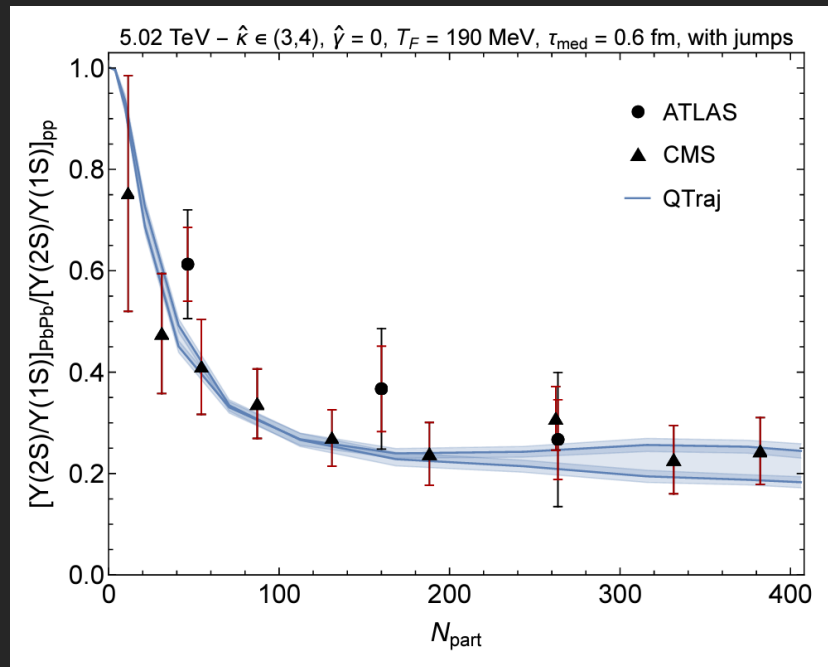
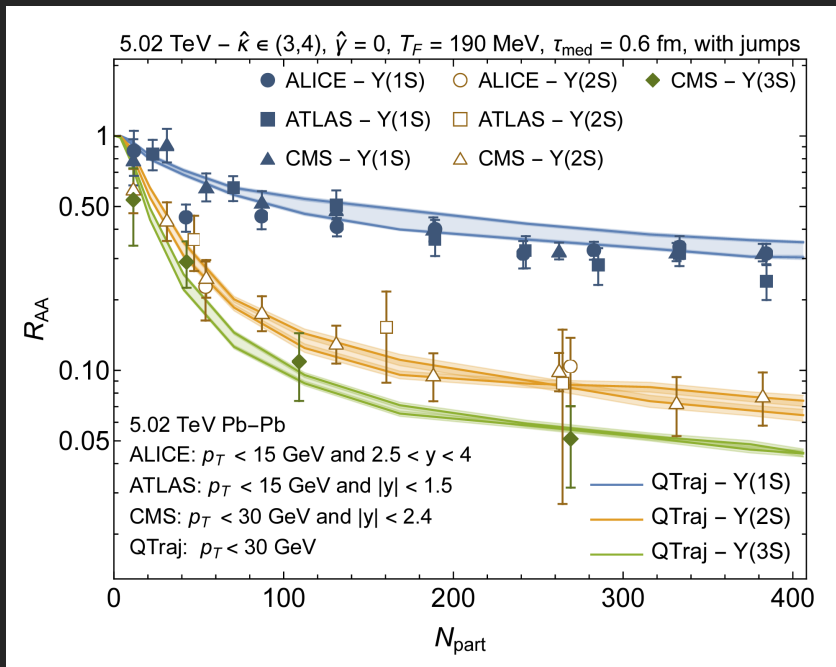


reference search



195 citations

Bottomonium suppression as a QGP “smoking gun”



M. Strickland and S. Thapa, Phys. Rev. D 108, 014031 (2023)

Support for CNR research comes from

