Biró et al.

A Personal Perspective of a Decade

Gábor Bíró

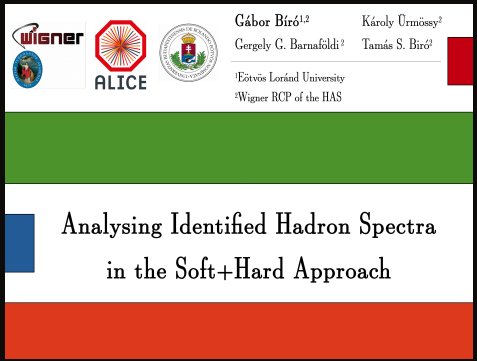
70th Birthday Conference of Prof. Tamás Sándor Biró

BTSLXX | 11–12. 06. 2026

Joining the Group – 2014-2015

- Non-extensive statistical phenomenology: already an active and vibrant research area at Wigner RCP.
- Not just a research topic, but a *way of approaching many problems*.

Came in as a genuine rookie to this topic.



The Name Ambiguity

As it appears in print

Biró, Tamás Sándor
Wigner RCP, Budapest

The Name Ambiguity

As it appears in print

Biró, Tamás Sándor
Wigner RCP, Budapest

||

And then again

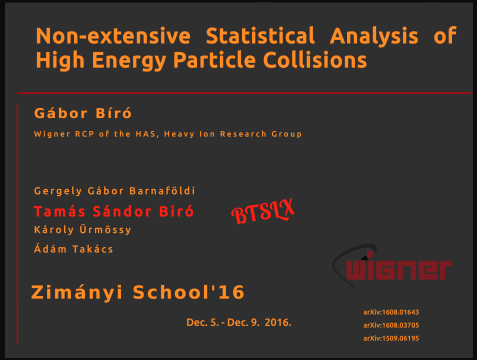
Bíró, Gábor
Wigner RCP, Budapest

Which Biró?

A recurring feature of conference programmes, email threads...

BTSLX, Zimányi Winter School – 2016

- I was there. I even gave a talk.
  Barely one year into the PhD.



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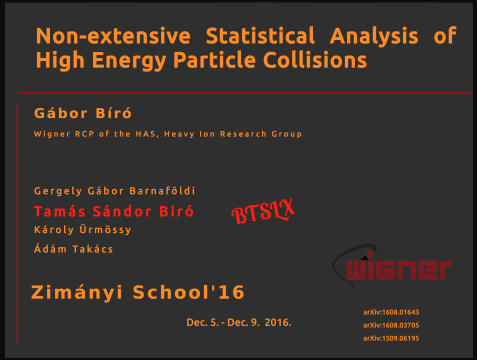

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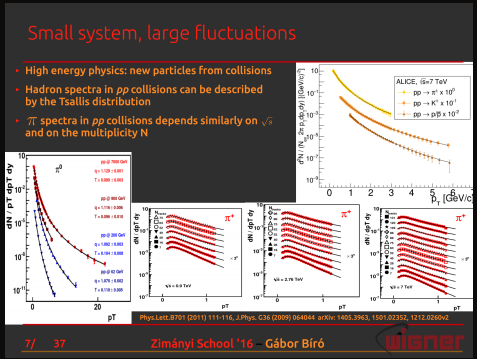
Now ten years later. I'd like to think I have a slightly better idea of what I'm talking about.



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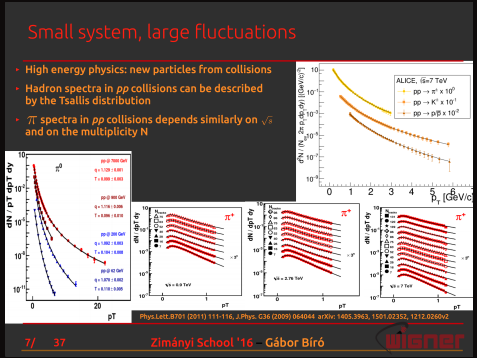
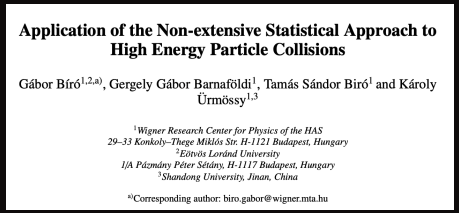


First Appearances in the Literature – 2016–2017

G. Bíró, G.G. Barnaföldi, T.S. Biró, K. Ürmössy

Application of the Non-extensive Statistical Approach to High Energy Particle Collisions

AIP Conf. Proc. **1853** (2017) arXiv:1608.01643



Application of the Non-extensive Statistical Approach to High Energy Particle Collisions

Gábor Bíró[1,2,a)], Gergely Gábor Barnaföldi[1], Tamás Sándor Biró[1] and Károly Ürmössy[1,3]

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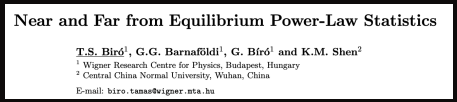
[2]*Eötvös Loránd University*
1/A Pázmány Péter Sétány, H-1117 Budapest, Hungary
[3]*Shandong University, Jinan, China*

a)Corresponding author: biro.gabor@wigner.mta.hu

T.S. Biró, G.G. Barnaföldi, G. Bíró, K. Shen

Near and Far from Equilibrium Power-Law Statistics

J. Phys. Conf. Ser. **779** (2017) arXiv:1608.03705



Near and Far from Equilibrium Power-Law Statistics

T.S. Biró[1], G.G. Barnaföldi[1], G. Bíró[1] and K.M. Shen[2]
[1] Wigner Research Centre for Physics, Budapest, Hungary
[2] Central China Normal University, Wuhan, China

E-mail: biro.tamas@wigner.mta.hu

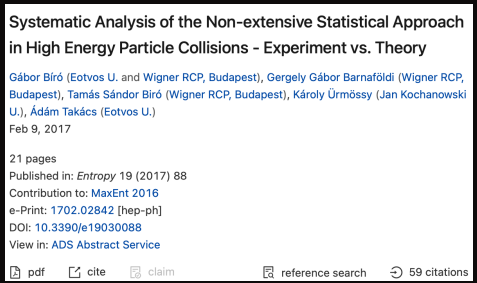
The first time "Biró et al." appeared in print – with my name in the lead.

The Systematic Analysis – 2017

G. Bíró, G.G. Barnaföldi, T.S. Biró, K. Ürmössy, Á. Takács

Systematic Analysis of the Non-extensive Statistical Approach in High Energy Particle Collisions — Experiment vs. Theory

Entropy 19 (2017), 88 arXiv:1702.02842


Systematic Analysis of the Non-extensive Statistical Approach in High Energy Particle Collisions - Experiment vs. Theory

Gábor Bíró (Eotvos U. and Wigner RCP, Budapest), Gergely Gábor Barnaföldi (Wigner RCP, Budapest), Tamás Sándor Biró (Wigner RCP, Budapest), Károly Ürmössy (Jan Kochanowski U.), Ádám Takács (Eotvos U.)
Feb 9, 2017

21 pages
Published in: *Entropy* 19 (2017) 88
Contribution to: MaxEnt 2016
e-Print: 1702.02842 [hep-ph]
DOI: 10.3390/e19030088
View in: ADS Abstract Service

pdf cite claim reference search 59 citations

- Comprehensive RHIC + LHC dataset; multiple collision systems and particle species.
- First large-scale experiment-vs-theory comparison.
- **59 citations** — an early-career milestone.

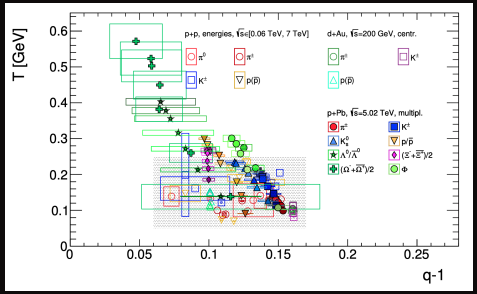
Extending the Picture – 2018–2019

G. Bíró, G.G. Barnaföldi, T.S. Biró, K. Shen

Mass hierarchy and energy scaling of the Tsallis–Pareto parameters in hadron productions at RHIC and LHC energies
EPJ Web Conf. **171** (2018) arXiv:1710.09062

G. Bíró, G.G. Barnaföldi, G. Papp, T.S. Biró

Multiplicity Dependence in the Non-Extensive Hadronization Model Calculated by the HIJING++ Framework
Universe 5 (2019), 134 arXiv:1905.11272



From establishing the framework to probing its structure. HIJING++ brought a dynamical Monte Carlo dimension.

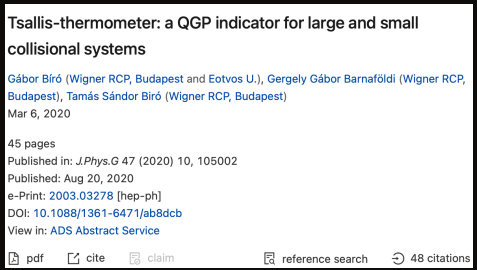
The Tsallis-Thermometer – 2020

G. Biró, G.G. Barnaföldi, T.S. Biró

Tsallis-thermometer: a QGP indicator for large and small collisional systems

J. Phys. G 47 (2020), 105002
arXiv:2003.03278

- Can non-extensive parameters serve as a genuine thermometer in *all* collision systems?


Tsallis-thermometer: a QGP indicator for large and small collisional systems

Gábor Bíró (Wigner RCP, Budapest and Eotvos U.), Gergely Gábor Barnaföldi (Wigner RCP, Budapest), Tamás Sándor Biró (Wigner RCP, Budapest)
Mar 6, 2020

45 pages
Published in: *J.Phys.G* 47 (2020) 10, 105002
Published: Aug 20, 2020
e-Print: 2003.03278 [hep-ph]
DOI: 10.1088/1361-6471/ab8dcb
View in: ADS Abstract Service

pdf cite claim reference search 48 citations

“Biró et al.” in the Literature

Joint contribution

6

joint papers

110+

combined citations

- Non-extensive statistics programme: internationally recognised.
- By now, “Biró” in this literature carries *a small ambiguity.*

I feel honored and humbled to be part of this confusion — a small but real contribution to a widely cited school.

A substantial part of my PhD dissertation was built on our joint work as well.

Open Questions

- What is the connection between the event activity classifiers and the non-extensivity parameter?
- Is the non-extensivity parameter genuinely universal across collision types and energies?
- What does the multiplicity dependence of the statistical parameters tell us about the initial state?


Effect of event classification on the Tsallis-thermometer

László Gyulai, Gábor Bíró,* Róbert Vértesi,† and Gergely Gábor Barnaföldi

HUN-REN Wigner Research Center for Physics, 29–33 Konkoly–Thege Miklós Str., H-1121 Budapest, Hungary

(Dated: January 8, 2026)

L. Gyulai, G. Bíró, R. Vértesi, G.G. Barnaföldi

Effect of event classification on the Tsallis-thermometer
Phys.Rev.D 113, 016021 **1** (2026)
arXiv:2601.04106

The research programme is far from complete. The open questions still form a hot topic (pun intended).

Boldog születésnapot, Tamás!