Markus Antonio Amano

Theoretical Physicist, PhD

March 5, 1994

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American

inokawazu

Research Interest: Holography, Hydrodynamics, Higher Dimensional Gravity, String Theory

Birth Surname: Garbiso

Languages

English (Native) ●●●●●

Japanese (Adept) ●●●●○

Hard Skills

Mathematica ●●●●●

Python ●●●●○

Julia ●●●○○

About Me

I am a recently grduated PhD from **The University of Alabama**. I currently work on modeling Quark Gluon Plasma-like fluids with broken symmetries under the guidance of **Dr. Matthias Kaminski**. We seek to understand such fluids with modern holographic techniques. Practically we work with classical gravity on the AdS "gravity" side to analyze the Quark Gluon Plasma-like fluid. Using novel spacetimes and classical theories of gravity to break symmetries, we can understand the properties of dual fluids. My current aspiration is to understand spin and its coupling to angular momentum in strongly coupled fluids - like the Quark Gluon Plasma.

Notable Publications (iNSPIRE) (arχiv)

May, 2021 — **Holographic Techniques Applied and to Rotating fluids and and Non-Relativistic Fluids**
Markus Garbiso
Dissertation

December, 2020 — **Hydrodynamics of simply spinning black holes & hydrodynamics for spinning quantum fluids**
Markus Garbiso, Matthias Kaminski
JHEP

August, 2020 — **Resonating AdS Soliton**
Markus Garbiso, Takaaki Ishii, Keiju Murata
JHEP

October, 2019 — **Dispersion relations in non-relativistic two-dimensional materials from quasinormal modes in Hořava Gravity**
Markus Garbiso, Matthias Kaminski
JHEP

Professional Experience

Research

Jan. 2017 – Present — **Graduate Research** — The University of Alabama
Various projects which involved calculating hydrodynamical quantities and quasinormal modes of non relativistic theories (Hořava Gravity in AdS) and systems with broken symmetries. Holography was used to in such research.

May 2013 – Aug. 2016 — **Undergraduate Research** — The Colorado School of Mines
Various projects the included: *Classifying Nuclear Data*, *Tested Impact of Porosity on Coking Sensors. Python* and *Mathematica* where used for programming.

Oct. 2014 – Aug. 2015 — **Junior Year Program in English (JYPE)** — Tohoku University
Helped to implement XFPS to analyze photon beams. Programming was done with *ROOT* (CERN).

Teaching/Tutoring

Sep. 2017 – Present — Part Time Physics/Math Tutor — Applied Tutoring

Aug. 2016 – Present — Graduate Teaching Assistant — University of Alabama

Jul. 2020 – Jul. 2020 — **Physics Instructor** — University of Alabama
Introduction to Electromagnetism and Modern Physics

Aug. 2015 – May 2016 — Center for Academic Services and Advising (CASA) Tutor — The Colorado School of Mines

Jan. 2013 – May 2013 — Center for Academic Services and Advising (CASA) Tutor — The Colorado School of Mines

Jan. 2013 – May 2013 — Multicultural Engineering Program Tutor — The Colorado School of Mines

Markus Antonio Amano

Theoretical Physicist, PhD

Memberships

President - PAGSA (Physics Astronomy Graduate Student Association)

Past Memberships

Secretary - JACEC (Japanese American Cultural Exchange Club)

Education

Postgraduate Training

2016 – 2021 Theoretical Physics PhD — GPA: 3.939 - The University of Alabama

Undergraduate Study

2012 – 2016 B.S. Engineering Physics — GPA: 3.586 - The Colorado School of Mines

2014 – 2015 Junior Year Program in English (JYPE) — Tohoku University

Current Projects

Jun. 2020 – Present **Holography with Spin**
We seek to introduce spin degrees of freedom into hydrodynamics. Using Lovelock Chern-Simons gravity we hope to expand on the work by Gallegos and Gürsoy - *Holographic spin liquids and Lovelock Chern-Simons gravity*.

Jun. 2020 – Present **Chaos and Hydrodynamics**
We hope to find chaos related quantities - Lyapunov exponent and butterfly velocity - for novel hologrphic gravity backgrounds. Key-words: Pole-Skipping Points, Convergence of hydrodynamic, Chaos Points

Science Communication

Notable Talks

Feb. 2020 **Research Seminar** — Tokyo University
Globally Rotating Holographic Fluid Hydrodynamics

Feb. 2020 **Research Seminar** — Ochanomizu University
Globally Rotating Holographic Fluid Hydrodynamics

Feb. 2020 **Research Seminar** — Chuo University
Globally Rotating Holographic Fluid Hydrodynamics

July 2019 **Research Seminar** — Würzburg University
Non-Relativistic Hydrodynamics

July 2017 **Conference Talk** — 3rd Karl Schwarzschild Meeting at FIAS, Frankfurt
Non-Relativistic Hydrodynamics

July 2019 **Research Seminar** — Frankfurt Institute for Advanced Studies
Non-Relativistic Hydrodynamics

International Collaborations

Nov. 2019 – Present **Spin-Orbital Coupling** — Frankfurt Institute for Advanced Studies (FIAS)
We are working with Enrico Speranza (Frankfurt University, Germany) generalizing the hydrodynamic description to include spin degrees of freedom and rotation.

Feb. 2020 – Jul. 2020 **Resonating AdS Soliton** — Nihon University & Kyoto University
Worked with Professors Keiju Murata (Nihon University, Japan) and Takaaki Ishi (Kyoto University, Japan), we investigated an “AdS Soliton Resonator”.

Honors & Awards

March, 2020 Outstanding Research by a Master’s Student — The University of Alabama
2016 – GTA Fellowship — The University of Alabama
2014 – 2015 JASSO Scholarship — Tohoku University
2009 – 2012 Deans List — The Colorado School of Mines
2008 Private Donation (USD 1,000) — Anonymous Private Donor