Curiculum Vitae

Athanasios Psaltis, Ph.D.
Postdoctoral Researcher

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Research Interests

nuclear astrophysics • experimental studies with stable and radioactive ion beams • large-scale nuclear impact studies • radiative capture reactions with recoil separators • charged-particle spectroscopy • in-beam and activation γ-ray spectroscopy • nuclear reaction networks

Education

McMaster University • Hamilton, ON, Canada — September 2015 – August 2020
Ph.D. in Physics

Advisor: Prof. Alan Chen
Thesis title: "Radiative alpha capture on ^{7}Be with DRAGON at vp-process nucleosynthesis energies"

National and Kapodistrian University of Athens • Athens, Greece — October 2010 – September 2014
B.Sc. in Physics

Advisor: Assoc. Prof. Theodoros Mertzimekis
Minored in astrophysics. Thesis title: "Experimental studies of cross sections and angular distributions of ^{112}Cd(p,γ)^{113}In with application in nucleosynthesis"

Research Positions

Technische Universität Darmstadt – Postdoctoral Researcher — September 2020 – Present
Darmstadt, Germany
Working with Prof. Almudena Arcones on nuclear and astrophysical uncertainties in core–collapse supernovae and neutron star mergers using large–scale impact studies with reaction networks. [Pubs. A009, A010, A012, A014, A019–A022, B013]

McMaster University – Research Assistant — September 2015 – August 2020
Hamilton, ON, Canada
Worked with Prof. Alan Chen in the nuclear astrophysics group. Participated in experiments at major nuclear physics laboratories worldwide as a visiting graduate researcher (TRIUMF, RIKEN, NSCL, Argonne National Laboratory, TUNL and Maier-Leibnitz-Laboratorium). [Pubs. A003–A008, A011, A013, A015, A016–A018, B001–B005, B007–B012, B014, B015]

Los Alamos National Laboratory – Visiting Graduate Researcher — May 2019
Los Alamos, NM, USA
Worked with Drs. Samuel Jones and Chris Fryer on reaction network calculations for the vp–process with NuGrid. Code development on NuGrid's `NuPPN` nuclear reaction network to include neutrino reactions.

TRIUMF – Visiting Graduate Researcher — June 2017 – September 2017

Vancouver, BC, Canada

Worked with the DRAGON group during the preparations of my Ph.D. thesis project. Also assisted in other experiments carried by the DRAGON/TUDA group. [Pubs. B003, B007]

N.C.S.R. "Demokritos" – Undergraduate Researcher November 2013 – March 2014
Athens, Greece

Worked in the Tandem Accelerator Lab of the Institute of Nuclear and Particle Physics for my undergraduate thesis, conducting the first cross section and angular distribution measurements of the astrophysically interesting reaction ^{112}Cd(p,γ)^{113}In for p–process nucleosynthesis. I also assisted in two more nuclear astrophysics experiments, studying cross sections and angular distributions of ^{nat}Ag(p,γ)^{108,109}Cd and ^{110}Pd(p,γ)^{111}Ag.
[Pubs. A002, A003, B006, C001, C002]

NuSTRAP - University of Athens – Database Contributor November 2011 – September 2015
Athens, Greece

Completion and upgrade of the Electromagnetic Moment Resources online database. The database is currently hosted by International Atomic Energy Agency (IAEA) Nuclear Data Services. [Pub. A001]

Honours & Awards

The Frank Dennee Scholarship – McMaster University 2017, 2019

ComSciCon 2018 – National Science Communication Workshop 2018
Selection to attend the workshop from over 900 applicants.

International Excellence Award – McMaster University 2018

The Bridge residency program – SciArt Center 2017
Four-month virtual residency program, where artists
and scientists are paired to collaborate on a project of their choice.

Approved User Facility Proposals

5. *"Determining the Site of Globular Cluster Potassium Enrichment via the* ^{38}Ar(p, γ)^{39}K *Reaction in Inverse Kinematics"*
   Spokesperson: C. Marshall, Co-spokespersons: **A. Psaltis** and K. Chipps
   e21070 of FRIB PAC1 meeting (2021)

4. *"Studying neutrino–driven wind nucleosynthesis with MUSIC: Measurement of the* ^{93}Sr(α, xn) *cross section"*
   Spokespersons: **A. Psaltis** and W.J. Ong
   #1923 of the ATLAS PAC (2021)

3. *"Studying supernova nucleosynthesis with CRIB: Measurement of the* ^{13}N(α, p)^{16}O *reaction"*
   Spokesperson: **A. Psaltis**
   AVF69 of the 21st Nuclear Physics PAC of RI Beam factory (2020)

2. *"Studying stellar helium burning with DRAGON: Direct measurement of the* ^{18}O(α, γ)^{22}Ne *reaction"*
   Spokespersons: **A. Psaltis**, A.A. Chen, A. Lennarz and M. Williams
   S1928 of TRIUMF EEC 201906S meeting (2019)

1. *"Breakout reactions from the pp-chain and the vp-process: Measurement of the* ^{7}Be(α, γ)^{11}C *reaction rate in inverse kinematics"*
   Spokespersons: **A. Psaltis**, A.A. Chen and D.S. Connolly
   S1692 of TRIUMF EEC 201607S meeting (2016)

Teaching Experience

Technische Universität Darmstadt September 2021 – February 2022
Darmstadt, Germany
Consulting students for their research projects (Stellar Structure and Explosive Nucleosynthesis) in the "Nuclear Astrophysics" seminar.

McMaster University – Teaching Assistant September 2015 – May 2020
Hamilton, ON, Canada
Introduction to experiments, one-on-one lab assistance (∼30 students), answering questions, test invigilation as well as marking quizzes, lab reports and exams.
Classes taught:

- *PHYS 1A03*: Introductory Physics
- *PHYS 1E03*: Waves, Electricity and Magnetic Fields
- *PHYS 1AA3*: Introduction to Modern Physics
- *Astronomy/Origins 2B03*: Big Questions
- *Arts & Science 2D06*: Physics
- *iSCI 3A12*: Light, the Universe, and Everything (LUE)

Mentoring

- Jan Kuske: Nucleosynthesis calculations for the *r*–process (M.Sc. student 2021 – present)
- Liam Kroll: Core–Collapse Supernovae simulations using `MESA` (summer student 2018, 2019)
  Now graduate student at Dalhousie University (Halifax, NS, Canada)
- Physics & Astronomy Mentor-mentee program (2016 – 2020)

Science Communication

ComSciConCAN – Co-founder/ Organizing Committee Member September 2018 - Present
ComSciCon is a workshop series organized by graduate students, for graduate students, focused on science communication skills. Our goal is to empower future leaders in technical communication to share the results from research in their field to broad and diverse audiences, not just practitioners in their fields. The event started in the US in 2013 and for the first time it was hosted in Canada in summer 2019.

ScienceSeeker – Science news editor February 2016 - February 2022
Edited in one of the Top 100 Science Blogs on the Web. My role included picking interesting blog posts about Art, Physics and General Science out of a collection of 2,300 blogs and other science news sources from around the globe every week. Picks can be found in Twitter using the hashtag #SciSeekPicks.

William J. McCallion Planetarium – Producer/Presenter November 2015 - August 2020
Hamilton, ON, Canada
Production and live presentation of educational shows. Presented in thousands of people, mostly students and the general public. Produced three full–dome interactive public shows:

- *"Rust and stardust: The lives of the stars and the origin of the elements"* – 2016
- *"Star Wars: The Science Awakens"* – 2017
- *"The golden dance of death"* – 2019

Pint of Science – City Coordinator January 2018 - August 2020
Hamilton, ON, Canada
Pint of Science is a non-profit organization that brings some of the most brilliant scientists to your local pub to discuss their latest research and findings with you. Organization of the event in Hamilton.

Researchers' Night Hamilton – Coordinator October 2015 - August 2020
Hamilton, ON, Canada
Researchers' Night is a European–based concept, which gives the public a unique opportunity to interact with scientists in a non-formal way for an evening. Coordination of the invited scientists, setup of the event and social media coverage.

SciCo – Science Ambassador September 2015 - April 2019
Athens, Greece
SciCo is the first Non Profit Science Communication Organization in Greece. Part of the organizing team of the biggest Science Festival in Greece with more than 30,000 visitors every year - Athens Science Festival. Attended trainings on creative writing, creative storytelling and science communication.

Professional Service

Frontiers in Astronomy and Space Sciences – Reviewer August 2022 – Present
ELEMENTS – Member March 2022 – Present
Universe – Reviewer December 2021 – Present
NuGrid Collaboration – PI Team February 2021 – Present
SFB 1245 – Member September 2020 – Present
IReNA Online Seminar Series – Committee Member September 2020 – Present
Chair since October 2021.
"Virtual workshop on (α, n) reactions for astrophysics" – Chair 14-15 July 2021
JINA Horizons – Twitter Team 30 November – 4 December 2020

Publications

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Journal Publications: 7 first/second author, 18 Nth author
Conference Proceedings: 4 first author, 11 Nth author
In the publications noted with a $\star$, I led the nucleosynthesis calculations

A Journal Publications

[A025] **A. Psaltis** and F. Montes, *(α,n) reactions for astrophysics*, J. Phys. G: Nucl. Part. Phys., **Invited Topical Review** expected Q2 2023

[A024] H. Jayatissa *et al.* (including **A. Psaltis**), *Study of the ^{22}Mg waiting point relevant for x-ray burst nucleosynthesis using a direct measurement of the ^{22}Mg(α,p)^{25}Al reaction*, Phys. Rev. Lett., Submitted (2022)

[A023] M. Williams *et al.* (including **A. Psaltis**), *Cross Sections of the ^{83}Rb(p,γ)^{84}Sr and ^{84}Kr(p,γ)^{85}Rb Reactions at Energies Characteristic of the Astrophysical γ Process*, Phys. Rev. C, Submitted (2022)

[A022] N. Vukman *et al.* (including **A. Psaltis**), *Cluster decays of ^{12}Be excited states*, Frontiers in Physics, Frontiers in Physics, Accepted (2022)

[A021] H. Schatz *et al.* (including **A. Psaltis**), *Horizons: Nuclear Astrophysics in the 2020s and Beyond*, J. Phys. G: Nucl. Part. Phys., Accepted (2022)

[A020] **A. Psaltis** *et al.*, *First inverse kinematics measurement of resonances in ^{7}Be(α, γ)^{11}C relevant to neutrino–driven wind nucleosynthesis using DRAGON*, Phys. Rev. C **106** 045805 (2022), doi 10.1103/PhysRevC.106.045805

[A019] **A. Psaltis** *et al.*, *Direct measurement of resonances in $^{7}Be(\alpha,\gamma)^{11}C$ relevant to νp–process nucleosynthesis*, Phys. Rev. Lett., **129** 162701 (2022), doi 10.1103/PhysRevLett.129.162701

[A018] L. Lombardo *et al.* (including **A. Psaltis**), *Chemical Evolution of R-process Elements in Stars (CERES) I. Stellar parameters and chemical abundances from Na to Zr*, A&A, Accepted (2022), doi 10.1051/0004-6361/202243932

[A017] **A. Psaltis** *et al.*, *Constraining nucleosynthesis in neutrino–driven winds: observations, simulations and nuclear physics*, Astrophys. J, **935**, 27 (2022) doi 10.3847/1538-4357/ac7da7 ⋆

[A016] T. Budner *et al.* (including **A. Psaltis**), *Constraining the $^{30}P(p,\gamma)^{31}S$ reaction rate in ONe novae via the weak, low-energy, β-delayed proton decay of ^{31}Cl*, Phys. Rev. Lett., **128**, 182701 (2022), doi 10.1103/PhysRevLett.128.182701

[A015] J. Hooker *et al.* (including **A. Psaltis**), *Use of Bayesian Optimization to Understand the Structure of Nuclei*, Nucl. Instr. Meth. Phys. Res. B, **512** 6 (2022), doi 10.1016/j.nimb.2021.11.014

[A014] J. S. Randhawa *et al.* (including **A. Psaltis**), *First direct measurement of $^{59}Cu(p,\alpha)^{56}Ni$: A step towards constraining the Ni-Cu cycle in the Cosmos*, Phys. Rev. C, **104** L042801 (2021), doi 10.1103/PhysRevC.104.L042801

[A013] M. Witt, **A. Psaltis** *et al.*, *Post-explosion evolution of core-collapse supernovae*, Astrophys. J, **921** 19 (2021), doi 10.3847/1538-4357/ac1a6d ⋆

[A012] J. Hu *et al.* (including **A. Psaltis**), *Advancement of Photospheric Radius Expansion and Clocked Type-I X-Ray Burst Models with the New $^{22}Mg(\alpha,p)^{25}Al$ Reaction Rate Determined at the Gamow Energy*, Phys. Rev. Lett., **127**, 172701 (2021), doi 10.1103/PhysRevLett.127.172701

[A011] M. Holl *et al.* (including **A. Psaltis**), *Proton inelastic scattering reveals deformation in ^{8}He*, Phys. Lett. B, **822**, 136710 (2021), doi 10.1016/j.physletb.2021.136710

[A010] P. Mohr *et al.* (including **A. Psaltis**), *Astrophysical reaction rates of α-induced reactions for nuclei with $26 \leq Z \leq 83$ from the new Atomki-V2 α-nucleus potential*, At. Data Nucl. Data Tables, **142**, 101453 (2021), doi 10.1016/j.adt.2021.101453

[A009] T. N. Szegedi *et al.* (including **A. Psaltis**), *Activation thick target yield measurement of $^{100}Mo(\alpha,n)^{103}Ru$ for studying the weak r-process nucleosynthesis*, Phys. Rev. C, **104**, 035804 (2021), doi 10.1103/PhysRevC.104.035804 ⋆

[A008] G. Lotay *et al.* (including **A. Psaltis**), *First direct measurement of an astrophysical p process reaction cross section using a radioactive ion beam*, Phys. Rev. Lett., **127**, 112701 (2021), doi 10.1103/PhysRevLett.127.112701

[A007] M. Lovely *et al.* (including **A. Psaltis**), *Proton capture on ^{34}S in the astrophysical energy regime of ONe novae*, Phys. Rev. C, **103**, 055801 (2021), doi 10.1103/PhysRevC.103.055801

[A006] **A. Psaltis** *et al.*, *Beyond the acceptance limit of DRAGON: the case of the $^{6}Li(\alpha,\gamma)^{10}B$ reaction*, Nucl. Instr. Meth. Phys. Res. A, **987**, 164828 (2021), doi 10.1016/j.nima.2020.164828

[A005] M. Williams *et al.* (including **A. Psaltis**), *First inverse kinematics study of the $^{22}Ne(p,\gamma)^{23}Na$ reaction and its role in AGB star and classical nova nucleosynthesis*, Phys. Rev. C, **102**, 035801 (2020), doi 10.1103/PhysRevC.102.035801

[A004] A. Lennarz *et al.* (including **A. Psaltis**), *First inverse kinematics measurement of key resonances in the $^{22}Ne(p,\gamma)^{23}Na$ reaction at stellar temperatures*, Phys. Lett. B **807**, 135539 (2020), doi 10.1016/j.physletb.2020.135539

[A003] **A. Psaltis** *et al.*, *Cross–section measurements of radiative proton–capture reactions in ^{112}Cd at energies of astrophysical interest*, Phys. Rev. C **99**, 065807 (2019), doi 10.1103/PhysRevC.99.065807

[A002] A. Khaliel *et al.* (including **A. Psaltis**), *First cross–section measurements of the reactions $^{107,109}Ag(p,\gamma)^{108,110}Cd$ at energies relevant to the p process*, Phys. Rev. C **96**, 035806 (2017), doi 10.1103/PhysRevC.96.035806 – *Academy of Athens award on Experimental Physics*

[A001] T.J. Mertzimekis, K.Stamou and **A. Psaltis**, *An online database of nuclear electromagnetic moments*, Nucl. Instr. Meth. Phys. Res. A, **807**, 56 (2016), doi 10.1016/j.nima.2015.10.096

B Conference Proceedings (Peer–Reviewed)

[B015] T. Wheeler *et al.* (including **A. Psaltis**), *Measuring the $^{15}O(\alpha,\gamma)^{19}Ne$ Reaction in Type I X-ray Bursts using the GADGET II TPC: Hardware*, EPJ Web of Conferences **260** 11046 (2022), doi 10.1051/epjconf/202226011046

[B014] R. Mahajan *et al.* (including **A. Psaltis**), *Measuring the $^{15}O(\alpha,\gamma)^{19}Ne$ Reaction in Type I X-ray Bursts using the GADGET II TPC: Software*, EPJ Web of Conferences **260** 11034 (2022), doi 10.1051/epjconf/202226011034

[B013] **A. Psaltis** *et al.*, *Exploring the uncertainties of (α, xn) reactions for the weak r-process*, EPJ Web of Conferences **260** 07003 (2022), doi 10.1051/epjconf/202226007003

[B012] J. Hu *et al.* (including **A. Psaltis**), *First measurement of ^{25}Al+p resonant scattering relevant to the astrophysical reaction $^{22}Mg(\alpha,p)^{25}Al$* , EPJ Web of Conferences **260** 05001 (2022), doi 10.1051/epjconf/202226005001

[B011] H. Yamaguchi *et al.* (including **A. Psaltis**), *Experimental studies on astrophysical reactions at the low- energy RI beam separator CRIB*, EPJ Web of Conferences **260** 03003 (2022), doi 10.1051/epjconf/202226003003

[B010] J. Liang *et al.* (including **A. Psaltis**), *Spectroscopic Study of ^{39}Ca for Endpoint Nucleosynthesis in Classical Novae*, J. Phys.: Conf. Ser. **1668** 012025 (2020), doi 10.1088/1742-6596/1668/1/012025

[B009] **A. Psaltis** *et al.*, *Study of the $^{7}Be(\alpha,\gamma)^{11}C$ reaction with DRAGON for vp–process nucleosynthesis*, J. Phys.: Conf. Ser. **1668** 012035 (2020), doi 10.1088/1742-6596/1668/1/012035

[B008] H. Shimizu *et al.* (including **A. Psaltis**), *Study on $^{26m}Al(p,\gamma)$ Reaction at the SNe Temperature*, JPS Conf. Proc. **31**, 011073 (2020), doi 10.7566/JPSCP.31.011073

[B007] **A. Psaltis** *et al.*, *Radiative alpha capture on ^{7}Be with DRAGON at energies relevant to the vp–process*, Springer Proceedings in Physics – NIC XV (2018), 425-428, doi 10.1007/978-3-030-13876-9_81

[B006] **A. Psaltis** *et al.*, *First radiative proton–capture cross–section measurements in mid–weight nuclei relevant to the p–process*, Springer Proceedings in Physics – NIC XV (2018), 421-424, doi 10.1007/978-3-030-13876-9_80

[B005] J. Liang *et al.* (including **A. Psaltis**), *Spectroscopic study on ^{39}Ca using the $^{40}K(d,t)^{39}Ca$ reaction for classical nova endpoint nucleosynthesis*, Springer Proceedings in Physics – NIC XV (2018), 397-400, doi 10.1007/978-3-030-13876-9_74

[B004] H. Shimizu *et al.* (including **A. Psaltis**), *Isomeric ^{26}Al beam production with CRIB*, EPJ Web of Conferences **184**, 02013 (2018), doi 10.1051/epjconf/201818402013

[B003] N. Vukman *et al.* (including **A. Psaltis**), *Examining the Helium Cluster Decays of the ^{12}Be Excited States by Triton Transfer to the ^{9}Li Beam*, RÁBIDA 2018: Basic Concepts in Nuclear Physics: Theory, Experiments and Applications pp 257-258, doi 10.1007/978-3-030-22204-8_43

[B002] D. Kahl *et al.* (including **A. Psaltis**), *Impact of the $^{26m}Al(p,\gamma)$ reaction to galactic ^{26}Al yield*, AIP Conference Proceedings **1947**, 020003 (2018), doi 10.1063/1.5030807

[B001] D. Kahl *et al.* (including **A. Psaltis**), *Isomer beam elastic scattering: $^{26m}Al(p,p)$ for Astrophysics*, EPJ Web of Conferences **165**, 01030 (2017), doi 10.1051/epjconf/201716501030

C Conference Proceedings (Non–Peer–Reviewed)

[C002] A. Khaliel *et al.* (including **A. Psaltis**), *Experimental Investigation of radiative proton-capture reactions relevant to Nucleosynthesis*, HNPS2016 Proceedings, doi 10.12681/hnps.1861

[C001] E. Batziou *et al.* (including **A. Psaltis**), *Modeling radiative proton–capture reactions in mid–heavy nuclei*, HNPS2015 Proceedings, doi 10.12681/hnps.1893

D Books

[D003] *Galactic and Stellar Physics* by A.G.W. Cameron, Based on a course lecture given at Yale University 1964-1965, Compiled by W.D. Arnett, C.J. Hansen and J.W. Truran, re-typeset in LaTeX by D. Kahl, **A. Psaltis** and J. Liang (in preparation)

[D002] *Physics of the Solar System* by A.G.W. Cameron, Based on a course lecture given at Yale University 1963-1964, Compiled by W.D. Arnett, C.J. Hansen and J.W. Truran, re-typeset in LaTeX by D. Kahl, **A. Psaltis** and J. Liang (in preparation)

[D001] *Nuclear Astrophysics* by A.G.W. Cameron, Based on a course lecture given at Yale University 1962-1963, Assisted by W.D. Arnett, C.J. Hansen and J.W. Truran, re-typeset in LaTeX by D. Kahl, **A. Psaltis** and J. Liang (in preparation)

Academic Presentations

Origin of Matter and Evolution of Galaxies (OMEG16) – oral (Virtually)	October 2022
28th International Nuclear Physics Conference – oral (Cape Town, South Africa)	September 2022
Nuclear Physics in Astrophysics X – oral (Geneva, Switzerland)	September 2022
FRIB Theory Seminar – **invited oral** (East Lansing, MI, USA)	June 2022
2022 JINA-CEE Frontiers in Nuclear Astrophysics – poster (South Bend, IN, USA)	May 2022
ELEMENTS Annual Conference 2022 – oral (Frankfurt, Germany)	May 2022
ELEMENTS Kick-off WA3 workshop – **invited oral** (Virtually)	February 2022
Advisory Committee On TRIUMF (ACOT) meeting – **invited poster** (Virtually)	November 2021
28th Symposium of the Hellenic Nuclear Physics Society – oral (Athens, Greece)	September 2021
XVI Nuclei in the Cosmos – oral & poster (Virtually)	September 2021
DPG Matter and Cosmos Section – oral (Virtually)	August 2021
TRIUMF Science Week – poster (Virtually)	August 2021
2021 CAP Virtual Congress – oral (Virtually)	June 2021
IKP Seminar – **invited oral** (Darmstadt, Germany)	August 2020
Advisory Committee On TRIUMF meeting – **invited oral** (Vancouver, BC, Canada)	November 2019
7th p–process workshop 2019 – oral (Serralunga d' Alba, Italy)	September 2019
Nuclear Physics in Astrophysics IX – oral (Mainz, Germany)	September 2019
CNLS Astrophysics Friday Meeting – **invited oral** (Los Alamos, NM, USA)	May 2019
5th Joint Meeting of the APS DNP and the PSJ – oral (Waikoloa, HI, USA)	October 2018
15th International Symposium on Nuclei in the Cosmos – posters (Assergi, Italy)	June 2018
15th Russbach School on Nuclear Astrophysics – oral (Russbach, Austria)	March 2018

Nuclear Astrophysics at Rings and Recoil Separators Workshop – oral (Darmstadt, Germany)	March 2018
TRIUMF Science Week – poster (Vancouver, BC, Canada)	July 2017
2017 JINA-CEE Frontiers in Nuclear Astrophysics – oral (Lansing, MI, USA)	February 2017
McMaster Physics & Astronomy Symposium Day – oral (Hamilton, ON, Canada)	October 2016
École Joliot-Curie: “Origin of Nuclei in the Universe” – poster (Le Barcarès, France)	September 2016
p-process Workshop 2015: Status and Outlook – oral (Limassol, Cyprus)	June 2015
24th Symposium of the Hellenic Nuclear Physics Society – poster (Ioannina, Greece)	May 2015
23th Symposium of the Hellenic Nuclear Physics Society – oral (Thessaloniki, Greece)	June 2014
Charged Particle Optics: Theory and Simulation (CPOTS 2013) – oral (Heraklion, Greece)	August 2013
21st Symposium of the Hellenic Nuclear Physics Society – poster (Athens, Greece)	May 2012

References

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