Curiculum Vitae

Athanasios Psaltis, Ph.D.

Postdoctoral Research Scholar

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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 y-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 ⁷Be 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,y) 113 In with application in nucleosynthesis" \nearrow

Research Positions

Triangle Universities Nuclear Laboratory – Postdoctoral Research Scholar January 2023 – Present Durham, NC, USA

Working with Profs. Christian Iliadis and Richard Longland on experimental and theoretical nuclear astrophysics.

Technische Universität Darmstadt – Postdoctoral Researcher September 2020 – January 2023 Darmstadt, Germany

Worked 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,y) 113 In for p-process nucleosynthesis. I also assisted in two more nuclear astrophysics experiments, studying cross sections and angular distributions of $^{nat}Ag(p,\gamma)^{108,109}Cd$ and $^{110}Pd(p,\gamma)^{111}Ag$.

[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 2017

The Bridge residency program – SciArt Center

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 ³⁸Ar(p, y)³⁹K 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 $^{13}N(\alpha, p)^{16}O$ 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 $^{18}O(\alpha, \gamma)^{22}Ne$ 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 $(\alpha, \gamma)^{11}$ 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 (\sim 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** – Pl Team February 2021 – Present SFB 1245 - Member September 2020 – Present **IReNA Online Seminar Series** – Committee Member September 2020 - Present Chair since October 2021. 14-15 July 2021

"Virtual workshop on (α,n) reactions for astrophysics" – Chair

30 November - 4 December 2020

JINA Horizons - Twitter Team

Publications

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Journal Publications: 7 first/second author, 19 Nth author Conference Proceedings: 4 first author, 11 Nth author

In the publications noted with a ⋆, I led the nucleosynthesis calculations

A Journal Publications

- [A028] **A. Psaltis** and F. Montes, (α, n) reactions for astrophysics, J. Phys. G: Nucl. Part. Phys., **Invited** Topical Review expected Q2 2023
- [A027] L. Varga et al. (including A. Psaltis), Proton-Capture Studies in the ESR Storage Rings: Measurement of 124 Xe(p,y) and 124 Xe(p,n) at Improved Sensitivity, Phys. Rev. Lett., Submitted
- [A026] L. Roberti et al. (including A. Psaltis), The y-process nucleosynthesis in core-collapse supernovae I. A novel analysis of y-process yields in massive stars, Astron. & Astrophys., Submitted (2023)
- [A025] J. Kavoor et al. (including **A. Psaltis**), Structure studies of ¹³Be, Phys. Rev. C, Submitted (2022)

- [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 ⁸³Rb(p,γ)⁸⁴Sr and ⁸⁴Kr(p,γ)⁸⁵Rb Reactions at Energies Characteristic of the Astrophysical γ Process, Phys. Rev. C, **10**7 035803 (2023), ⁶⁰ 10.1103/PhysRevC.107.035803
- [A022] H. Schatz et al. (including **A. Psaltis**), Horizons: Nuclear Astrophysics in the 2020s and Beyond, J. Phys. G: Nucl. Part. Phys. **49**, 110502 (2022), © 10.1088/1361-6471/ac8890 **Major Review**
- [A021] N. Vukman *et al.* (including **A. Psaltis**), *Cluster decays of* ¹²*Be excited states*, Front. Phys. **10** 1009421 (2022), 10.3389/fphy.2022.1009421
- [A020] **A. Psaltis** et al., First inverse kinematics measurement of resonances in ⁷Be(α, γ)¹¹C relevant to neutrino–driven wind nucleosynthesis using DRAGON, Phys. Rev. C **106** 045805 (2022), ⁶⁰ 10.1103/PhysRevC.106.045805
- [A019] **A. Psaltis** et al., Direct measurement of resonances in $^7Be(\alpha, \gamma)^{11}C$ relevant to νp –process nucleosynthesis, Phys. Rev. Lett., **129** 162701 (2022), 0 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), 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) [™] 10.3847/1538-4357/ac7da7 ★
- [A016] T. Budner *et al.* (including **A. Psaltis**), Constraining the ³⁰P(p, γ)³¹S reaction rate in ONe novae via the weak, low-energy, β-delayed proton decay of ³¹Cl, Phys. Rev. Lett., **128**, 182701 (2022), ³⁰ 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), (a) 10.1016/j.nimb.2021.11.014
- [A014] J. S. Randhawa et al. (including **A. Psaltis**), First direct measurement of ⁵⁹Cu(p, α) ⁵⁶Ni: A step towards constraining the Ni-Cu cycle in the Cosmos, Phys. Rev. C, **104** L042801 (2021), ⁶⁰ 10.1103/PhysRevC.104.L042801
- [A012] J. Hu *et al.* (including **A. Psaltis**), Advancement of Photospheric Radius Expansion and Clocked Type-I X-Ray Burst Models with the New ²²Mg(α, p)²⁵Al Reaction Rate Determined at the Gamow Energy, Phys. Rev. Lett., **127**, 172701 (2021), ⁶⁰ 10.1103/PhysRevLett.127.172701
- [A011] M. Holl *et al.* (including **A. Psaltis**), *Proton inelastic scattering reveals deformation in ⁸He*, Phys. Lett. B, **822**, 136710 (2021), 10.1016/j.physletb.2021.136710
- [A010] P. Mohr et al. (including **A. Psaltis**), Astrophysical reaction rates of α -induced reactions for nuclei with $26 \le Z \le 83$ from the new Atomki-V2 α -nucleus potential, At. Data Nucl. Data Tables, **142**, 101453 (2021), α 10.1016/j.adt.2021.101453
- [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), 10.1103/PhysRevLett.127.112701
- [A007] M. Lovely et al. (including **A. Psaltis**), Proton capture on ³⁴S in the astrophysical energy regime of ONe novae, Phys. Rev. C, **103**, 055801 (2021), ⁶⁰ 10.1103/PhysRevC.103.055801

- [A006] **A. Psaltis** et al., Beyond the acceptance limit of DRAGON: the case of the $^6Li(\alpha, \gamma)^{10}B$ reaction, Nucl. Instr. Meth. Phys. Res. A, **987**, 164828 (2021), 6 10.1016/j.nima.2020.164828
- [A005] M. Williams et al. (including **A. Psaltis**), First inverse kinematics study of the ²²Ne(p, γ)²³Na reaction and its role in AGB star and classical nova nucleosynthesis, Phys. Rev. C, **102**, 035801 (2020), ⁶ 10.1103/PhysRevC.102.035801
- [A004] A. Lennarz *et al.* (including **A. Psaltis**), *First inverse kinematics measurement of key resonances in the* ²²Ne(p, γ)²³Na reaction at stellar temperatures, Phys. Lett. B **807**, 135539 (2020), ⁶⁰ 10.1016/j.physletb.2020.135539
- [A003] **A. Psaltis** et al., Cross–section measurements of radiative proton–capture reactions in ¹¹²Cd at energies of astrophysical interest, Phys. Rev. C **99**, 065807 (2019), ⁶⁰ 10.1103/PhysRevC.99.065807
- [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), 40 10.1016/j.nima.2015.10.096

B Conference Proceedings (Peer–Reviewed)

- [B016] H. Yamaguchi et al. (including A. Psaltis), RIB induced reactions: Studying astrophysical reactions with low-energy RI beam at CRIB, EPJ Web of Conferences 275 01015 (2023), 10.1051/epjconf/202327501015
- [B015] T. Wheeler *et al.* (including **A. Psaltis**), *Measuring the* ¹⁵O(α, γ)¹⁹Ne Reaction in Type I X-ray Bursts using the GADGET II TPC: Hardware, EPJ Web of Conferences **260** 11046 (2022), ⁶⁰ 10.1051/epjconf/202226011046
- [B014] R. Mahajan *et al.* (including **A. Psaltis**), *Measuring the* ¹⁵O(α, γ)¹⁹Ne Reaction in Type I X-ray Bursts using the GADGET II TPC: Software, EPJ Web of Conferences **260** 11034 (2022), [©] 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), 0 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(α , p) 25 Al , EPJ Web of Conferences **260** 05001 (2022), 60 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), ⁶⁰ 10.1051/epjconf/202226003003
- [B010] J. Liang et al. (including **A. Psaltis**), Spectroscopic Study of ³⁹Ca for Endpoint Nucleosynthesis in Classical Novae, J. Phys.: Conf. Ser. **1668** 012025 (2020), © 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), 40 10.1088/1742-6596/1668/1/012035
- [B008] H. Shimizu *et al.* (including **A. Psaltis**), *Study on* ^{26m}*Al*(*p*, *γ*) *Reaction at the SNe Temperature*, JPS Conf. Proc. **31**, 011073 (2020), ⁶⁰ 10.7566/JPSCP.31.011073
- [B007] **A. Psaltis** et al., Radiative alpha capture on ⁷Be with DRAGON at energies relevant to the *vp*–process, Springer Proceedings in Physics NIC XV (2018), 425-428, ⁶⁰ 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 <i>p*–process, Springer Proceedings in Physics NIC XV (2018), 421-424, 10.1007/978-3-030-13876-9_80
- [B005] J. Liang et al. (including **A. Psaltis**), Spectroscopic study on ³⁹Ca using the ⁴⁰K(d,t)³⁹Ca reaction for classical nova endpoint nucleosynthesis, Springer Proceedings in Physics NIC XV (2018), 397-400, ⁴⁰ 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), ^(a) 10.1051/epjconf/201818402013
- [B003] N. Vukman et al. (including **A. Psaltis**), Examining the Helium Cluster Decays of the ¹²Be Excited States by Triton Transfer to the ⁹Li Beam, RÁBIDA 2018: Basic Concepts in Nuclear Physics: Theory, Experiments and Applications pp 257-258, 10.1007/978-3-030-22204-8_43
- [B002] D. Kahl *et al.* (including **A. Psaltis**), *Impact of the* ^{26m}*Al(p,γ) reaction to galactic* ²⁶*Al yield*, AIP Conference Proceedings **1947**, 020003 (2018), ⁶ 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), ⁶⁰ 10.1051/epiconf/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, @ 10.12681/hnps.1861
- [C001] E. Batziou *et al.* (including **A. Psaltis**), *Modeling radiative proton*–capture reactions in mid–heavy nuclei, HNPS2015 Proceedings, @ 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 Large 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 Large to D. Kahl, A. Psaltis and J. Liang (in preparation)

Academic Presentations

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Texas A&M Cyclotron colloquium – invited oral (College Station, TX USA)	April 2023
Nuclear Lunch Webinar – invited oral (Athens, Greece)	December 2022
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	A) 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	a) 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, Franc	ce) September 2016
p-process Workshop 2015: Status and Outlook – oral (Limassol, Cyprus)	June 2015
24th Symposium of the Hellenic Nuclear Physics Society - poster (Ioannina, Gre	ece) May 2015
23th Symposium of the Hellenic Nuclear Physics Society - oral (Thessaloniki, Gr	reece) 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, Greek	ce) May 2012