

Curriculum Vitae Prof. A. Musumarra

Academic education

Prof. Agatino Musumarra graduated in 1992 (110/110 Cum Laude) and got the Ph.D. in Nuclear Physics in 1996, both at the University of Catania (UoC).

Professional record

2011 - promoted by selection “Valutazione Comparativa” to *Associate Professor* at UoC, currently he holds this position at UoC as “*confirmed Associate Professor*”.

2001 -permanent position by selection “Valutazione Comparativa” as *Lecturer* at UoC.

2000 -two years *post-doctoral position at UoC* as “Assegnista di Ricerca”.

1998 -one year *Research Assistant at Université Catholique de Louvain* (Louvain-la-Neuve - Belgium).

1996 -two years *INFN post-doctoral position at Commissariat à l’Energie Atomique CEA-Saclay* (France).

1996 -R&D *collaboration contract* by ST-Microelectronics.

Scientific profile

Prof. Agatino Musumarra has been involved in Heavy Ion Nuclear Physics since 25 years, in studies concerning nuclear reactions with both stable and unstable nuclei. His research activity has been supported in the most important European Facilities for Heavy Ions (GANIL France, CRC-LLN Belgium, DTL-Bochum Germany, Rudjer Boskovic Zagreb Croatia, ISOLDE-CERN Switzerland, GSI-Germany, NCSR “DEMOKRITOS”-Athens Greece, n_ToF-CERN Switzerland).

The research activity has been mainly focused on:

- Nuclear structure studies of radioactive (^6He , ^8Li , ^{11}Be , ^7Be) and stable nuclei.
- GDR studies and pre-equilibrium gamma-ray emission at low and intermediate energies.
- Determination of astrophysical relevant cross sections at very low energies by direct and indirect methods.

Recently his efforts has been devoted to investigate neutron capture reactions of astrophysical interest in primordial nucleosynthesis in order to solve the so-called “*Cosmological Lithium Problem*”.

A relevant part of his experimental activity concerns the R&D of new techniques and detectors for ionizing particles, in collaboration with a leading industry in this field (SGS-Thomson Microelectronics). In the same framework an important contribution has been given to the development of a new experimental technique for non-destructive analysis of archeological samples (*PIXE-alpha*).

During his career, he has been *charged of technical and financial support to the European groups* at Louvain-la-Neuve CRC Facility in Belgium (1999-2000).

Prof. Agatino Musumarra has been *INFN-LNS chairman* (2000-2006) of the ASFIN2 group based at Laboratori Nazionali del Sud INFN-LNS Catania.

In 2001 he was elected by the LNS-INFN users “*User Committee member of INFN-LNS*”, charge he held from 2001 to 2003.

He was *member of the Laboratory Council* of LNS as *Representative of LNS-INFN researchers* (elected in 2007).

For his scientific merits in 2007 he has been *appointed by INFN “Incaricato di Ricerca”* and he has been associated to the Laboratori Nazionali del Sud (LNS), he is currently *spokesperson of two PAC approved experiments at n_ToF-CERN and INFN-LNS*.

He was *Master's Degree thesis supervisor* (Nuclear Physics) in 2002 (Dr. M. La Cognata - 110/110 Cum Laude) in 2004 (F. Mudò – 110/110), 2008 (F. De Luca – 104/110), 2013(C. Altana – 109/110), 2014 (M. Battiato-110/110).

According to the *ISI WoS* he has more than *230 scientific papers published and ISI certified* with more than **3852 citations (no self-citations)**.

H-index(ISI) : 37 publications with more than 37 citations each



Track record Prof. A. Musumarra

Most relevant publications:

- 1. Physics Letters B518, pag. 27-33(2001)**
Probing the ${}^6\text{He}$ Halo Structure with Elastic and Inelastic Proton Scattering
A.Lagoyannis, F.Auger, **A.Musumarra**, N.Alamanos, E.C.Pollacco, A.Pakou, Y.Blumenfeld, F.Braga, M.LaCommara, A.Drouart, G.Fioni, A.Gillibert, E.Khan, V.Lapoux, W.Mittig, S.Ottini-Hustache, D.Pierrotsakou, M.Romoli, P.Roussel-Chomaz, M.Sandoli, D.Santonocito, J.A.Scarpaci, J.L.Sida, T.Suomijarvi, S.Karataglidis, K.Amos.
- 2. Physical Review C vol. 64, 068801 (2001)**
Improved Information on the ${}^2\text{H}({}^6\text{Li}, \alpha){}^4\text{He}$ Reaction Extracted via the 'Trojan Horse' Method
A.Musumarra, R.G.Pizzone, S.Blagus, M.Bogovac, P.Figuera, M.Lattuada, M.Milin, D.Miljanic, M.G.Pellegriti, D.Rendic, C.Rolfs, N.Soic, C.Spitaleri, S.Typel, H.H.Wolter, M.Zadro.
- 3. Nature vol. 431, pag. 823-826 (2004)**
No enhancement of fusion probability by the neutron halo of ${}^6\text{He}$
R.Raabe, J.L.Sida, J.L.Charvet, N.Alamanos, C.Angulo, J.M.Casandjian, S.Courtin, A.Drouart, D.J.C.Durand, P.Figuera, A.Gillibert, S.Heinrich, C.Jouanne, V.Lapoux, A.Lepine-Szily, **A.Musumarra**, L.Nalpas, D.Pierrotsakou, M.Romoli, K.Rusek, M.Trotta.
- 4. Phys.Rev. C 69, 044613 (2004)**
Reactions induced by the halo nucleus ${}^6\text{He}$ at energies around the Coulomb barrier
A.DiPietro, P. Figuera, F. Amorini, C. Angulo, G. Cardella, S. Cherubini, T. Davinson, D. Leanza, J. Lu, H. Mahmud, M. Milin, **A.Musumarra**, A. Ninane, M. Papa, M. G. Pellegriti, R. Raabe, F. Rizzo, C. Ruiz, A. C. Shotton, N. Soic, S. Tudisco, L. Weissman.
- 5. Physical Review Letters vol. 99, 262501 (2007)**
Measurement of the β^+ and Orbital Electron-Capture Decay Rates in Fully Ionized, Hydrogenlike, and Heliumlike ${}^{140}\text{Pr}$ Ions
Yu.A.Litvinov, F.Bosch, H.Geissel, J.Kurcewicz, Z.Patyk, N.Winckler, L.Batist, K.Beckert, D.Boutin, C.Brandau, L.Chen, C.Dimopoulou, B.Fabian, T.Faestermann, A.Fragner, L.Grigorenko, E.Haettner, S.Hess, P.Kienle, R.Knobel, C.Kozhuharov, S.A.Litvinov, L.Maier, M.Mazzocco, F.Montes, G.Munzenberg, **A.Musumarra**, C.Nociforo, F.Nolden, M.Pfutzner, W.R.Plass, A.Prochazka, R.Redda, R.Reuschl, C.Scheidenberger, M.Steck, T.Stohlker, S.Torilov, M.Trassinelli, B.Sun, H.Weick, M.Winkler.
- 6. Nuclear Instruments and Methods in Physics Research Section A Vol. 581 pag 783-790 (2007)**
 4π Neutron detection with low-intensity radioactive beams
A. Del Zoppo, P. Figuera, **A. Musumarra**, N. Colonna, R. Alba, C. Bonomo, S. Cherubini, L. Cosentino, A. Di Pietro, M. Gulino, M. La Cognata, L. Lamia, M.G. Pellegriti, R.G. Pizzone, C. Rolfs, S. Romano, C. Spitaleri, S. Tudisco, A. Tumino.
- 7. Physics Letters B 664, pag. 157-161 (2008)**
On the magnitude of the ${}^8\text{Li} + {}^4\text{He} \rightarrow {}^{11}\text{B} + n$ reaction cross section at the Big-Bang temperature
M.La Cognata, A.DelZoppo, P.Figuera, **A.Musumarra**, R.Alba, S.Cherubini, N.Colonna, L.Cosentino, V.Crucilla, A.Di Pietro, M.Gulino, L.Lamia, M.G.Pellegriti, R.G.Pizzone, S.M.R.Puglia, G.G.Rapisarda, C.Rolfs, S.Romano, M.L.Sergi, C.Spitaleri, S.Tudisco, A.Tumino.
- 8. Physical Review C 78, pag. 054317 (2008)**
 α -decay half-lives for neutral atoms and bare nuclei
Z.Patyk, H.Geissel, Y.A.Litvinov, **A.Musumarra**, C.Nociforo.
- 9. Physical Review Letters 102, 152501 (2009)**
One-Neutron Removal Measurement Reveals ${}^{24}\text{O}$ as a New Doubly Magic Nucleus
R.Kanungo, C.Nociforo, A.Prochazka, T.Aumann, D.Boutin, D.Cortina Gil, B.Davids, M.Diakaki, F.Farinon, H.Geissel, R.Gernhauser, J.Gerl, R.Janik, B.Jonson, B.Kindler, R.Knobel, R.Krucken, M.Lantz, H.Lenske, Y.Litvinov, B.Lommel, K.Mahata, P.Maierbeck, **A.Musumarra**, T.Nilsson, T.Otsuka, C.Perro, C.Scheidenberger, B.Sitar, P.Strmen, B.Sun, I.Szarka, I.Tanihata, Y.Utsuno, H.Weick, M.Winkler.
- 10. Nuclear Instruments and Methods in Physics Research Section A vol. 612 pag 399-406 (2010)**
Measuring total reaction cross-sections at energies near the coulomb barrier by the active target method
A. Musumarra, P. Figuera, F. De Luca, A. Di Pietro, P. Finocchiaro, M. Fisichella, M. Lattuada, A. Pakou, M.G. Pellegriti, G. Randisi, G. Scalia, C. Scirè, S. Scirè, V. Scuderi, D. Torresi, M. Zadro.

11. Physical Review C vol. 88, pag. 011303 (2013)

Determination of the half-life of ^{213}Fr with high precision

M. Fischella, **A. Musumarra**, F. Farinon, C. Nociforo, A. Del Zoppo, P. Figuera, M. La Cognata, M. G. Pellegriti, V. Scuderi, D. Torresi, and E. Strano.

12. Physical Review Letters vol. 117 pag. 152701(2016)

Be-7(n,α)He-4 Reaction and the Cosmological Lithium Problem: Measurement of the Cross Section in a Wide Energy Range at n_{TOF} at CERN

Barbagallo, M.; **Musumarra, A.**; Cosentino, L.; et al.

13. European Physical Journal A vol. 53 pag. 145(2017)

PANDORA, a new facility for interdisciplinary in-plasma physics

Mascali, D.; **Musumarra, A.**; Leone, F.; et al.

Invited Talks and congress contribution

1. Invited talk CEA-Saclay Saclay, France 1996 "*Selective measurement of gamma-rays in reactions induced by HI around 7 MeV/A*".
2. Invited Talk CEA-Saclay Saclay, France 1997 "*A Monolithic Silicon DE-E Telescope*".
3. Invited Talk INFN-Napoli, Italy 1999 "*A link between gas and solid-state detectors: the Ramo theorem*".
4. EPS General Conference, Trends in Physics Budapest, Hungary 26-30 August 2002. "*Advanced application of the quasi-free reaction mechanism to nuclear astrophysics*".
5. SNNS forum: Exotic Nuclei and Astrophysics GANIL, Caen France 5-6 December 2002. "*Trojan-Horse Method, Experiments*".
6. Workshop on the Physics at the TANDEM-ALTO facility Orsay, France, 17-18 May 2004. "*Trojan horse method experiments using Tandem facilities*".
7. Invited talk for the FRS-ESR GSI group Darmstadt, Germany. May 2005. "*Electron Screening and alpha-decay*"
8. Invited talk for the SPIRAL2 Charged Particle Detection Working Group IPN Orsay, France, April 2006. "*Monolithic Si-Detectors*".
9. The VI international workshop on direct reactions with exotic beams (DREB2009) Tallahassee Florida, US 2009. "*Measuring total reaction cross-sections at energies near the coulomb barrier by the active target method*".
10. International Conference on Nuclear Structure and Dynamics '09 Dubrovnik, Croatia 2009. "*Electron Screening effects on alpha-decay*".
11. I ELIMED Workshop, INFN-LNS Catania, Italy October 2012 "*Advanced diagnostic for laser accelerated ion beams*".
12. The 2015 International Conference on Application of Nuclear Techniques, Crete Greece, 2015 "*Solid State detector for Neutron Flux and Beam Profile Measurement of the n_{TOF} facility at CERN*".
13. Invited talk at Nuclei in the Cosmos XIV Toki Messe, Niigata, Japan 2016 "*THE COSMOLOGICAL LITHIUM PROBLEM AND THE MEASUREMENT OF THE $^7\text{Be}(n,\alpha)$ REACTION at n_{TOF} -CERN*".
14. Invited talk at JINA-CEE Frontiers in Nuclear Astrophysics, Lansing, USA 2017 "*PANDORA a Facility for In-Plasma Nuclear Astrophysics*".

Experiment Spokesperson PAC referred

- E293 “ ${}^6\text{He}(p,p'){}^6\text{He}^*$ a $E_{\text{lab}}=40$ A· Mev” GANIL (1996 - Caen, Francia).
- PH116 “ ${}^6\text{He}$ sub-coulomb fusion-fission on U and Bi” CRC (1999 - Louvain-la-Neuve, Belgium).
- E04-RCS “Total reaction cross-section measurement ${}^{7-9}\text{Li}+{}^{28}\text{Si}$ ” LNS-INFN (2004 -Catania, Italy).
- E073 “Electron Screening and α -decay” GSI (2006 - Darmstadt, Germany).
- C073 “Electron Screening and α -decay” LNS-INFN (2011-Catania, Italy).
- “POLONIUM” LNS-INFN (2011-Catania, Italy).
- CERN-INTC-2015-039 Measurement of ${}^7\text{Be}(n,cp)$ cross-sections for the “*Cosmological Lithium Problem*” (2015-CERN Switzerland).

Funding ID

- 1998-2000 EU TMR research grant: financial coordinator, scientific and technical support responsible to the EU group operating at LLN-CRC facility (Louvain-la-Neuve Belgium).
- 2000-2006 ASFIN2 Laboratori Nazionali del Sud LNS - INFN: determination of astrophysical relevant cross sections at very low energies by direct and indirect methods. Financial and scientific responsible of the research group at LNS-Catania. Total funds managed: 394 keuro, years 2003-2005.
- 2007-2011 CLAD LNS-STREAM Laboratori Nazionali del Sud LNS – INFN: Nuclear structure studies of radioactive and stable nuclei; α -decay studies of radioactive nuclei (${}^{213}\text{Fr}$). Group member. Total funds in participation: 387 keuro, years 2008-2010.
- 2008 PRA University of Catania, “Progetti di Ricerca di Ateneo”. Research activity in the field of Nuclear Structure funded by the University of Catania. Total funds managed: 6 keuro.

Funded Post-doctoral position

- 2010 University of Catania and LNS-INFN, two-years post-doc position “Assegno di Ricerca” (PRA and INFN funding) held by Dr. V. Scuderi.