

Alain Goasduff

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Education

- 2009–2012 **PhD**, *expected in June 2012*.
IPHC Strasbourg – Université de Strasbourg, Strasbourg, France
- 2007–2009 **Master 2 PSA** (Physique Subatomique et Astroparticules).
Université de Strasbourg, Strasbourg, France
- 2004–2007 **Licence de Physique**, *Cum laude*.
Université Louis Pasteur, Strasbourg, France

Scientific Experiences

PhD Thesis

Title *Intruder states in sd nuclei: from 1p-1h to np-nh excitations in neutron rich Si isotopes*
Supervisor Sandrine Courtin

Abstract New large-scale shell-model calculations with full $1\hbar\omega$ valence space for the *sd*-nuclei has been used for the first time to predict lifetimes of positive and negative parity states in neutron rich Si isotopes. The predicted lifetimes (1 - 100 ps) fall in the range of differential Doppler shifted method. Using the demonstrator of the European next generation γ -array, AGATA, in coincidence with the large acceptance PRISMA magnetic spectrometer from LNL (Legnaro) and the plunger, lifetimes in $^{32,33,34}\text{Si}$ isotopes were measured. As these nuclei are close to the island of inversion, ^{34}Si in particular, a comparison with shell-model calculations including $2\hbar\omega$ excitation has been performed.

The $n\hbar\omega$ structure in stable ^{28}Si was also studied. ^{28}Si is an important nucleus to understand the competition between mean-field and cluster structures. It displays a wealth of structures in terms of deformation and clustering. Light-heavy ions radiative capture, $^{12}\text{C}+^{16}\text{O}$, has been performed at energies below the Coulomb barrier. The measured γ -spectra indicate for the first time that the strongest part of the resonance decay proceeds through intermediate states around 10 MeV. Comparisons with previous data above the Coulomb barrier have been performed and the results have been interpreted in terms of a favoured feeding of $T = 1$ states in the ^{28}Si self conjugate nucleus.

Experimental skills

- Working experience with γ -ray detectors ranging from scintillators, like the BGO array (TRIUMF, Vancouver), to Ge detectors like the AGATA demonstrator (LNL, Legnaro).
- Use of electromagnetic separators ranging from the improved MAIALE spectrometer around 0° (LNL, Legnaro) to the large rejection 0° spectrometer DRAGON (TRIUMF, Vancouver) and the large acceptance PRISMA spectrometer (LNL, Legnaro).
- Use of particle detectors associated to these spectrometers (ionization chambers, MCP, PPAC, DSSSD).
- Analysis of complex experimental data from state of the art setups.

- Geant simulations for complete detection setups.
- Shell-model calculations with state of the art codes like Antoine and Nathan.

Languages

French Native speaker
 English Fluent, written and spoken

Computer skills

OS Linux, Windows, MacOS X
 Programming C/C++, Fortran77, Fortran 90-95
 Physics tools Root, Geant3/Geant4, Shell Model Codes (Antoine/Nathan), HIVAP, CCFULL
 Word processing Microsoft/Open Office, iWork, L^AT_EX, Spip

Teaching at the University of Strasbourg

2009-2012 Classical mechanics to Physics, Mathematics and Chemistry 1st year of university students
 2009-2012 Physics practicals to 1st year of university Physics students

Scientific organization

2010-2012 PhD Student representative: improvement of the PhD Student follow-up
 2012 Organization of the 3rd PhD Student Day
 2010 Organization of an internal workshop on Geant4

Student jobs

2008-2009 Physics and Chemistry courses to high school students.

References

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Meetings attended

Conferences

- May 2011 Fusion 11, St-Malo, France
 $^{12}\text{C}+^{16}\text{O}$ sub-barrier radiative capture cross-section measurements (Oral Contribution)
- Sept. 2010 Extremes of the nuclear landscape, Zakopane, Poland
Particle-hole intruder states in sd-nuclei: cluster states in ^{28}Si and $1\hbar\omega$ excitations in Ne isotopes (Poster Contribution)

Workshops

- Sept. 2011 Agata France meeting, Orsay, France
Lifetime measurements in $N = 20$ isotones of Si, P and S (Oral Contribution)
- Jan. 2011 Spiral2 Week, Caen, France
- April 2009 Agata workshop, Legnaro, Italy

Schools

- Dec. 2011 Modern Method of Collision Theory School, Strasbourg, France
- Sept. 2011 Joliot-Curie Summer School, La-Colle-sur-Loup, France
Intruder states in sd-nuclei: from $1p-1h$ to $np-nh$ excitations in neutron rich Si isotopes (Poster Contribution)
- Oct. 2010 Joliot-Curie Summer School, Lacanau, France
Particle-Hole Intruder States in sd-nuclei: Cluster States in ^{28}Si and $1\hbar\omega$ excitations across sd-nuclei (Oral Contribution)
- Dec. 2009 Shell Model Applications to Nuclear Spectroscopy, Caen, France
- Oct. 2009 Joliot-Curie Summer School, Lacanau, France

Publications

Refereed journals

- [1] The $^{12}\text{C}(^{16}\text{O},\gamma)^{28}\text{Si}$ radiative capture: structural aspects of the γ decay.
A. Goasduff, S. Courtin, F. Haas, D. Lehbertz, D. G. Jenkins, C. Beck, J. Fallis, C. Ruiz, D. A. Hutcheon, P.-A. Amandruz, C. Davis, U. Hager, D. Ottewell, and G. Ruprecht.
In preparation, Phys.Rev. C
- [2] AGATA demonstrator counting rate measurements for Plunger measurements.
A. Goasduff, J. J. Valiente Dobòn, F. Haas, A. Gadea, G. de Angelis, A. Gottardo, D. Montanari, D. R. Napoli, A. Pipidis, E. Sahin, D. Mengoni, S. Lunardi, D. Bazzacco, E. Farnea, C. Michelagnoli, F. Recchia, and C. A. Ur.
In preparation, Eur.Phys. J
- [3] Fusion of $^{40}\text{Ca} + ^{40}\text{Ca}$ and other Ca + Ca systems near and below the barrier.
G. Montagnoli, A. M. Stefanini, C. Jiang, H. Esbensen, L. Corradi, S. Courtin, E. Fioretto, **A. Goasduff**, F. Haas, A. F. Kifle, C. Michelagnoli, D. Montanari, T. Mijatović, K. E. Rehm, R. Silvestri, P. P. Singh, F. Scarlassara, S. Szilner, X. D. Tang, and C. A. Ur.
Accepted for publication at Phys.Rev. C
- [4] Interplay between single-particle and collective excitations in argon isotopes populated by transfer reactions.
S. Szilner, L. Corradi, F. Haas, D. Lehbertz, G. Pollarolo, C. A. Ur, L. Angus, S. Beghini, M. Bouhelal, R. Chapman, E. Caurier, S. Courtin, E. Farnea, E. Fioretto, A. Gadea, **A. Goasduff**, D. Jelavic-Malenica, V. Kumar, S. Lunardi, N. Marginean, P. Mason, D. Mengoni, G. Montagnoli, F. Nowacki, F. Recchia,

E. Sahin, M.-D. Salsac, F. Scarlassara, R. Silvestri, J. F. Smith, N. Soic, A. M. Stefanini, and J. J. Valiente-Dobon.

Phys.Rev. C **84**, 014325 (2011)

- [5] Near-barrier fusion and barrier distribution of $^{58}\text{Ni}+^{54}\text{Fe}$.
A. M. Stefanini, G. Montagnoli, L. Corradi, S. Courtin, E. Fioretto, **A. Goasduff**, F. Haas, P. Mason, R. Silvestri, P. P. Singh, F. Scarlassara, and S. Szilner.
Phys.Rev. C **81**, 037601 (2010)
- [6] Fusion hindrance for $^{58}\text{Ni}+^{54}\text{Fe}$.
A. M. Stefanini, G. Montagnoli, L. Corradi, S. Courtin, E. Fioretto, **A. Goasduff**, F. Haas, P. Mason, R. Silvestri, P. P. Singh, F. Scarlassara, and S. Szilner.
Phys.Rev. C **82**, 014614 (2010)

Conference proceedings

- [7] $^{12}\text{C}+^{16}\text{O}$ sub-barrier radiative capture cross-section measurements.
A. Goasduff, S. Courtin, F. Haas, D. Lebhertz, D. G. Jenkins, C. Beck, J. Fallis, C. Ruiz, D. A. Hutcheon, P.-A. Amandruz, C. Davis, U. Hager, D. Ottewell, and G. Ruprecht.
EPJ Web of Conferences **17**, 06002 (2011)
- [8] Quasi-elastic reactions: an interplay of reaction dynamics and nuclear structure.
S. Szilner, T. Mijatović, L. Corradi, G. Pollarolo, F. Haas, S. Courtin, E. Farnea, E. Fioretto, A. Gadea, **A. Goasduff**, D. Jelavić-Malenica, S. Lunardi, N. Marginean, G. Montagnoli, D. Montanari, F. Recchia, E. Sahin, F. Scarlassara, N. Soić, A. M. Stefanini, C. Ur, and J. J. Valiente-Dobón.
EPJ Web of Conferences **17**, 03005 (2011)
- [9] Clusters in Light Nuclei.
C. Beck, P. Papka, A. Sanchez i Zafra, S. Thummerer, F. Azaiez, P. Bednarczyk, S. Courtin, D. Curien, O. Dorvaux, **A. Goasduff**, D. Lebhertz, A. Nourreddine, M. Rousseau, M.-D. Salsac, W. von Oertzen, B. Gebauer, C. Wheldon, T. Kokalova, G. Efimov, V. Zherebchevsky, C. Schulz, H. G. Bohlen, D. Kamanin, G. de Angelis, A. Gadea, S. Lenzi, D. R. Napoli, S. Szilner, M. Milin, W. N. Catford, D. G. Jenkins, and G. Royer.
Acta Phys.Pol. **B42**, 747 (2011)
- [10] Radiative Capture in the $^{12}\text{C}+^{16}\text{O}$ System: Structural versus Statistical Aspects of the Decay.
S. Courtin, **A. Goasduff**, F. Haas, D. Lebhertz, D. G. Jenkins, P. A. Marley, D. A. Hutcheon, C. A. Davis, and C. Ruiz.
Acta Phys.Pol. **B42**, 757 (2011)
- [11] Performances of the Future Multidetector PARIS Illustrated on the Radiative Capture Physics Case.
D. Lebhertz, M. Ciemala, S. Courtin, **A. Goasduff**, F. Haas, D. G. Jenkins, M. Labiche, O. Roberts, and O. Stezowski.
Acta Phys.Pol. **B42**, 721 (2011)
- [12] Probing the $^{12}\text{C}-^{12}\text{C}$ and $^{12}\text{C}-^{16}\text{O}$ molecular states by radiative capture reactions: present status and future.
D. Lebhertz, S. Courtin, F. Haas, D. G. Jenkins, M. Ciemala, **A. Goasduff**, D. A. Hutcheon, M. Labiche, A. Michalon, O. Roberts, M.-D. Salsac, and O. Stezowski.
Int.J.Mod.Phys. **E20**, 793 (2011)
- [13] Search for $2d_{5/2}$ Neutron States in ^{69}Ni .
M. Moukaddam, G. Duchene, D. Beaumel, G. Burgunder, L. Caceres, E. Clement, D. Curien, F. Didierjean, B. Fernandez, C. Finck, F. Flavigny, S. Franchoo, J. Gibelin, S. Giron, A. Gillibert, **A. Goasduff**, S. Grevy, J. Guillot, F. Haas, F. Hammache, M. N. Harakeh, K. Kemper, V. Lapoux, Y. Matea, A. Matta, L. Nalpas, F. Nowacki, A. Obertelli, J. Pancin, L. Perrot, J. Piot, E. Pllumbi, R. Raabe, J. A. Scarpaci, N. de Sereville, K. Sieja, O. Sorlin, I. Stefan, C. Stoedel, and J. C. Thomas.
Acta Phys.Pol. **B42**, 541 (2011)