

International Conference & Satellite School

**THE ORIGIN OF COSMIC ELEMENTS
Past and Present Achievements, Future Challenges**

Barcelona, June 10-11/12-15, 2013

*** WORKSHOP, June 12-15**

**Venue: Escola Industrial –Universitat Politècnica de Catalunya
C. Comte d’Urgell 187, 08036 Barcelona**

FINAL PROGRAM

TUESDAY, June 11th

*Registration: 18.30 – 19.30

*Welcome reception: 19.30 – 21.00 [**The Welcome Reception will be served at:
Institut d’Estudis Catalans
C. del Carme, 47]**

WEDNESDAY, June 12th

- * 8.30 – 8.45 **Opening**, J. José (UPC-IEEC Barcelona)
- * 8.45 – 9.40 **Invited Review** (50 + 5 min), “Nuclear Astrophysics: Past and Present Achievements”, N. Prantzos (IAP Paris)

SESSION I: Nucleosynthetic fingerprints of the first stars

- * 9.40 – 10.15 **Overview** (30 + 5 min), “The First Stars”, M. Asplund (Australian National U; PL of **FirstStars**)
- * 10.15 – 10.40 (20 + 5 min), “Atomic diffusion in NGC 6752”, P. Gruyters (Uppsala U)

Coffee break: 10.40 – 11.10

- * 11.10 – 11.30 (15 + 5 min), “Spectral matching for elemental abundances of evolved stars of globular clusters”, J. Simpson (U Canterbury, New Zealand)
- * 11.30 – 11.55 (20 + 5 min), “Chemical compositions of multiple stellar populations in globular clusters”, S. Lucatello (INAF, Obs. Astron. Padova)
- * 11.55 – 12.20 (20 + 5 min), “The nucleosynthetic role of intermediate-mass and massive stars during the turbulent infancy of globular clusters”, C. Charbonnel (Geneve Obs.)

SESSION II: Stellar evolution of low and intermediate-mass stars

- * 12.20 – 12.55: **Overview** (30 + 5 min), “Nucleosynthesis and mixing in low-mass stars”, M. Busso (U Perugia)

Lunch: 13.00 – 14.45

- * 14.45 – 15.10 (20 + 5 min), “Are there 2 plateaux of the C abundance in CEMP turnoff stars?”, M. Spite (Obs. Paris)
- * 15.10 – 15.35 (20 + 5 min), “Carbon, nitrogen and oxygen isotope ratios in AGB carbon stars: constraints for stellar nucleosynthesis and mixing”, C. Abia (U Granada)
- * 15.35 – 15.55 (15 + 5 min), “The effect of key nuclear reaction rates on the properties of Cepheids”, G.M. Halabi (American U Beirut)
- * 15.55 – 16.20 (20 + 5 min), “Reaction rates for nucleosynthesis of light and intermediate-mass isotopes”, G. Imbriani (U Naples)

Coffee break: 16.20 – 16.50

SESSION III: Stellar binary systems: evolution, explosions and nucleosynthesis

- * 16.50 – 17.25 **Overview** (30 + 5 min), “Stellar beacons: classical novae, type Ia supernovae, X-ray bursts and stellar mergers”, J. José (UPC-IEEC Barcelona; PL of **EXNUC**)
- * 17.25 – 17.50 (20 + 5 min), “Nucleosynthesis in white dwarf close encounters and collisions”, E. García-Berro (UPC-IEEC Barcelona)
- * 17.50 – 18.15 (20 + 5 min), “SNIa: wonders and mysteries”, J. Isern (ICE, CSIC-IEEC Bellaterra)
- * 18.15 – 18.35 (15 + 5 min), “Nova re-accretion model for J-type carbon stars”, S. Sengupta (U Bonn)

THURSDAY, June 13th

- * 8.30 – 8.55 (20 + 5 min), “Chemical abundance analysis of symbiotic giants”,
J. Mikolajewska (Copernicus Astron. Center –Warsaw)
- * 8.55 – 9.20 (20 + 5 min), “High-energy emission during nova explosions”,
M. Hernanz (ICE, CSIC-IEEC Bellaterra)
- * 9.20 – 9.45 (20 + 5 min), “Nucleosynthesis in R Coronae Borealis stars”,
R. Longland (UPC-IEEC Barcelona)
- * 9.45 – 10.05 (15 + 5 min), “Disentangling binary spectra as a trace of CNO exposed layers of Algols: u Her”, A. Dervisoglu (Erciyes U)
- * 10.05 – 10.30 (20 + 5 min), “Burning chrome, or how secondary Fe-peak elements in supernova remnants can shed light on type Ia supernova progenitors”,
C. Badenes (U Pittsburgh)

Coffee break: 10.30 – 11.00

SESSION IV: Astrochemistry and cosmochemistry: dust production and presolar grains in meteorites

- * 11.00 – 11.35 **Overview** (30 + 5 min), “A study of dust synthesis and evolution in supernovae”, I. Cherchneff (U Basel; PL of **CoDustMas**)
- * 11.35 – 11.55 (15 + 5 min), “Dust formation in the ejecta of type II-P supernovae”,
A. Sarangi (U Basel)
- * 11.55 – 12.15 (15 + 5 min), “CO in the supernova remnant Cas A”, S. Wallström
(Onsala Space Obs., Chalmers U)
- * 12.15 – 12.35 (15 + 5 min), “Molecule reprocessing by shocks in the supernova remnant Cas A”, C. Biscaro (U Basel)
- * 12.35 – 13.00 (20 + 5 min), “ ^{60}Fe , ^{244}Pu and nanodiamonds”, A. Wallner (U Vienna)
- * 13.00 – 13.25 (20 + 5 min), “Challenges and solutions from oxygen and aluminum isotopic ratios in grains of AGB origin”, S. Palmerini (U Granada)

Lunch: 13.25 – 15.15

17.30 – 19.30 **Gaudí and Modernism in Barcelona** [Optional guided tour for interested participants; **30 €**]

19.45 – 23.00 **Night of History and Legend at Palau Requesens**

- * Glass of cava (Catalan champagne)
- * Guided tour through Barcelona’s Gothic Quarter
- * Dinner (traditional Medieval Catalan food)
- * Short Talk on Medieval Barcelona

FRIDAY, June 14th

SESSION V: Core-collapse supernovae and chemical evolution of the Galaxy

- * 8.30 – 9.05 **Overview** (30 + 5 min), Understanding massive stars: evolution and nuclear burning stages, supernova explosion mechanism(s), nucleosynthesis ejecta and their impact in chemical evolution, F.-K. Thielemann, (U Basel; PL of **MASCHE**)
- * 9.05 – 9.30 (20 + 5 min), “Observational constraints on massive-star nucleosynthesis”, R. Diehl (MPE Garching)
- * 9.30 – 9.55 (20 + 5 min), “Neutrinos in supernova evolution and nucleosynthesis”, G. Martínez-Pinedo (TU Darmstadt)
- * 9.55 – 10.20 (20 + 5 min), “Precise study of the supernova reaction $^{40}\text{Ca}(\alpha, \gamma)^{44}\text{Ti}$ by activation in the Dresden Felsenkeller”, D. Bemmerer (Helmholtz-Zentrum Dresden-Rossendorf)
- * 10.20 – 10.40 (15 + 5 min), “Long-lived radionuclides as indications of a close-by supernova explosion in deep-sea sediment cores”, J. Feige (U Vienna)

Coffee break: 10.40 – 11.10

- * 11.10 – 11.30 (15 + 5 min), “Experimental study of the $^{26}\text{Al}(n, p)^{26}\text{Mg}$ and $^{26}\text{Al}(n, \alpha)^{23}\text{Na}$ reactions using the $^{27}\text{Al}(p, p')^{27}\text{Al}$ inelastic scattering reaction”, N. de Séréville (IPN Orsay)
- * 11.30 – 11.55 (20 + 5 min), “Future challenges of Galactic chemical evolution”, C. Kobayashi (U Hertfordshire)
- * 11.55 – 12.20 (20 + 5 min), “The production of europium: supernovae versus merging neutron stars”, F. Matteucci (Trieste U)
- * 12.20 – 12.45 (20 + 5 min), “Effects of the radial inflow of gas and galactic fountains on the chemical evolution of the Milky Way and M31”, E. Spitoni (Trieste U)

[13.00 – 14.45 Meeting of the EuroGENESIS Project Leaders and Review Panel members]

Lunch: 13.00 – 14.45

SESSION VI: Nuclear physics of stars: theory and experiments

- * 14.45 – 15.20 **Overview** (30 + 5 min), “Progress and challenges in understanding nuclear reactions in astrophysical environments”, J. Blackmon (Louisiana State U)
- * 15.20 – 15.45 (20 + 5 min), “Search for ^{24}Mg resonances inside the Gamow window for $^{12}\text{C}+^{12}\text{C}$ ”, N. Soic (Rudjer Boskovic I, Zagreb)
- * 15.45 – 16.10 (20 + 5 min), “LUNA –MV: the next underground accelerator facility”, F. Strieder (Ruhr-U Bochum)
- * 16.10 – 16.30 (15 + 5 min), “Study of the crucial nuclear reaction $^{14}\text{O}(\alpha, p)$ in X-ray bursts”, J. Hu (I Modern Physics, Lanzhou)

Coffee break: 16.30 – 17.00

[17.00 – 18.00 Review Panel meeting]

- * 17.00 – 17.20 (15 + 5 min), “Application of the Trojan Horse Method to resonance reactions and implications for stellar nucleosynthesis”, M. La Cognata (INFN Catania)

- * 17.20 – 17.40 (15 + 5 min), “Proton and α -induced reaction cross sections on erbium isotopes for the astrophysical γ -process”, N. Özkan (Kocaeli U)
- * 17.40 – 18.00 (15 + 5 min), “Measurements of β -delayed neutrons for the third r-process peak”, R. Caballero-Folch (UPC Barcelona)

SATURDAY, June 15th

- * 9.20 – 9.45 (20 + 5 min), “Microscopic approaches for α -nucleus optical potentials for nucleosynthesis”, H. Leeb (TU Vienna)
- * 9.45 – 10.05 (15 + 5 min), “Experimental cross sections of proton-induced reactions on ^{152}Gd for the astrophysical p-process”, R. T. Güray (Kocaeli U)
- * 10.05 – 10.25 (15 + 5 min), “Experimental study of the key astrophysical reaction $^{18}\text{Ne}(\alpha, p)^{21}\text{Na}$ ”, L. Zhang (I Modern Physics, Lanzhou)

Coffee break: 10.25 – 11.00

SESSION VII: Challenges in nuclear astrophysics and related fields: open questions and research opportunities

* **11.00 – 13.00 Round Table**, Nuclear astrophysics in the post-EuroGENESIS era

Lunch: 13.00 – 14.30

End of Workshop