



51^{èmes} Journées des Actinides
April 10-14 2022, Santa Margherita, Italy

Organized by

Department of Chemistry and Industrial Chemistry, University of
Genoa

INFN, Genoa

CNR Institute SPIN, Genoa



Scope

The Journées des Actinides is an international conference series providing an informal forum for the discussion of current research on the physical and chemical properties of actinide elements, their alloys and compounds. Following previous events held in Erice (Italy, 2019), Praia de Porto Novo (Portugal, 2018), Karpacz (Poland, 2017), Alpe d'Huez (France, 2016), and last year's event organized online by the Institut des Sciences Chimiques de Rennes due to Sars-Cov-2 pandemics, we at the University of Genova are happy to welcome you again in person for JdA51.

Journées des Actinides – Committees

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**UNIVERSITÀ DEGLI STUDI
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Istituto Nazionale di Fisica Nucleare
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	Sunday 10	Monday 11	Tuesday 12	Wednesday 13	Thursday 14	
		08:50 Welcome address				
		I - Physics 1	IV - Chemistry	VI - Physics 4	X - Physics 5	
		09:00 I-O1 G. Lander-R. Caciuffo	09:00 IV-O14 A. Rauf	09:00 VI-O22 R. Caciuffo	09:00 X-O38 D. Chaney	
		09:45 I-O2 K. Kvashnina	09:25 IV-O15 R. Nicholls	09:25 VI-O23 V. Buturlim	09:25 X-O39 A. Provino	
		10:10 I-O3 L. Paolasini	09:50 IV-O16 V. Baumann	09:50 VI-O24 A. Goncalves	09:50 X-O40 J. C. Griveau	
		10:35 I-O4 T. Livneh	10:15 IV-O17 K. Stanistreet	10:15 VI-O25 D. Legut	10:15 X-O41 M. Au	
		11:00 Coffee break	10:40 Coffee break	10:40 VI-O26 O. Valu	10:40 Coffee break	
				11:05 Coffee break		
		II - Materials 1	V - Physics 3		Closing Session	
		11:30 II-O5 P. Rogl	11:10 V-O18 M. Osipenko	VII - Materials 2	11:10 JdA Awards	
		11:55 II-O6 S. Corradetti	11:35 V-O19 M. Fedkevych	11:35 VII-O27 A. Martinelli	11:35 Physics, 4th Gen	
		12:20 II-O7 E. Svanidze	12:00 V-O20 G. Zwicknagl	12:00 VII-O28 M. Martinez	12:00 Chem, mater, environ	
		12:45 II-O8 J. Bouchet	12:25 V-O21 F. Pinna	12:30 Conference Picture	12:25 Concluding Remarks	
		13:15 Lunch	13:00 Lunch	13:00 Lunch	13:00 Lunch	
		III - Physics 2		VIII - Environment, fuels		
		14:30 III-O9 M. Pasturel	14:30	14:30 VIII-O30 I. Halevy		
		14:55 III-O10 D. Braithwaite	14:55	14:55 VIII-O31 A. Holdsworth		
		15:20 III-O11 L. Havela	15:20	15:20 VIII-O32 G. Porto		
		15:45 III-O12 O. Koloskova	15:45	15:45 VIII-O33 B. Labonne		
		16:10 III-O13 L. Amidani	16:10	16:10 VIII-O34 G. Murphy		
16:30	Registration		Excursion			
		16:35 Coffee break		16:35	16:35 Coffee break	
		17:05 Poster 2' oral		17:05	IX - 4th Gen. Challenge	
		17:20 Poster Session I P1-P6			17:05 IX-O35 L. Ginotti	
		17:50		17:20	17:50 IX-O36 G. Firpo	
		18:00		17:50	18:15 IX-O37 M. Ripani	
		18:15		18:00	18:40 Free time	
		18:30 Meeting Internation Advisory Board		18:15	19:15 Bus to Camogli	
		18:40		18:30	20:00	
		19:15		18:40	20:30	
	19:30	19:15	22:00			
19:30	Welcome Party	20:00 Dinner	19:30			
20:00			20:00 Dinner			
20:30						
22:00						

Program

Sunday 10 April 2022

- 16:30 – 19:30 Registration open
 19:30 – 22:00 Welcome Party

Monday 11 April 2022

- 8:50 – 09:00 Welcome address

Session I – Physics 1

Chair: L. Havela

In memoriam Wojciech Suski

- 9.00 – 9.45 I-O1 R. Caciuffo, G. H. Lander, G. van der Laan
 Unravelling the physics of actinide materials by x-ray synchrotron radiation
- 9.45 – 10.10 I-O2 K. Kvashnina
 High-energy resolution X-ray spectroscopy at actinide $M_{4,5}$ edges: what we know, what we want to know, what we can know
- 10.10 – 10.35 I-O3 L. Paolasini, D. Chaney, A. Bosak, G. H. Lander, R. Caciuffo
 Anisotropic phonon line-broadening in UO_2 below room temperature
- 10.35 – 11.00 I-O4 T. Livneh
 Resonant Raman scattering in UO_2 revisited

- 11.00 – 11.30 **Coffee break**

Session II – Materials 1

Chair: I. Halevy

- 11.30 – 11.55 II-O5 P. F. Rogl, H. Noel
 Structure and Properties of Compounds in the U-Zr-Si system
- 11.55 – 12.20 II-O6 S. Corradetti, S. M. Carturan, M. Ballan, R. Eloirdi, P. A. Celdran, O. Walter, D. Staicu, O. D. Blanco, A. Andrighetto, L. Biasetto
 Graphene-derived uranium and thorium carbides for isotopes production targets

12.20 – 12.45	II-O7	<i>E. Svanidze, A. Leithe-Jasper, Yu. Grin</i>
		Crystallographic complexity in actinide-based materials
12.45 – 13.15	II-O8	<i>A. J. Bouchet, Castellano, F. Bottin</i>
		Thermodynamic properties at high temperature with machine learning
13.15 – 14.30		Lunch
		Session III – Physics 2
		Chair: L. Paolasini
14.30 – 14.55	III-O9	<i>M. Pasturel, S. Fryars, T. Guizouarn, P. Lemoine, C. Prestipino, R. Sibille</i>
		Complex magnetic ordering of U ₆ Nb ₄ Al ₄₃ : towards a new uranium frustrated magnet family?
14.55 – 15.20	III-O10	<i>M. Valiska, W. Knafo, G. Knebel, G. Lapertot, D. Aoki, D. Braithwaite</i>
		High pressure study of UTe ₂ in pulsed magnetic field
15.20 – 15.45	III-O11	<i>L. Havela, O. Koloskova, V. Buturlim, D. Legut</i>
		Revisited f-electron hydrides with focus on U-magnetism
15.45 – 16.10	III-O12	<i>O. Koloskova, S. Mašková-Černá, A. Kolomiets, K. Miliyanchuk, A. V. Andreev, V. Buturlim, L. Havela</i>
		U ₂ Ni ₂ Sn-U ₂ Fe ₂ Sn system – where is QCP?
16.10 – 16.35	III-O13	<i>L. Amidani, A. Volkova, M. Retegan, K. Popa, P. Martin, K. O. Kvashnina</i>
		Understanding the M ₄ edge HERFD XANES of U ⁶⁺
16.35 – 17.05		Coffee break
		Poster I (oral presentation)
		Chair: A. Martinelli
17.05 – 17.07	P1	<i>S. Massardo</i>
17.07 – 17.09	P2	<i>E. Perry</i>
17.09 – 17.11	P3	<i>A.V. Andreev</i>
17.11 – 17.13	P4	<i>A.P. Gonçalves</i>
17.13 – 17.15	P5	<i>E. Colineau</i>
17.15 – 17.17	P6	<i>F. Akbar</i>

17.20 – 19.30

Poster I (poster presentation)

P1

S. Massardo, C. Artini, M. M. Carnasciali, M. Pani

The important role of non-ambient conditions studies for the structural characterization of doped ceria systems

P2

E. Perry, A. Popel, Ian Farnan

The dissolution of mixed uranium, thorium dioxides in ground water solutions doped with hydrogen peroxide under anoxic conditions

P3

A.V. Andreev, N.V. Mushnikov, J. Kaštil, J. Šebek, Z. Arnold

Magnetism of $\text{UCo}_{1-x}\text{T}_x\text{Al}$ solid solutions with $T = 3d$ - and $5d$ - metals under hydrostatic pressure

P4

A. P. Gonçalves, L. C. J. Pereira, E. B. Lopes, L. C. Alves, V. Corregidor, I. C. Santos

Revisiting the UTe_3 compound

P5

E. Colineau, K. Boboridis, L. Aldave de las Heras, R. Eloirdi

The Actinide User Laboratory: JRC Open Access in Karlsruhe

P6

F. Akbar, A. Martinelli, I. Čurlík, M. Reiffers, M. Giovannini

Phase equilibria at 600 °C and magnetic properties in the Yb-Pd-In system (Pd \leq 60 at%)

20.00

Dinner

Tuesday 12 April 2022

Session IV – Chemistry

Chair: M. Pasturel

- 9.00 – 9.25 IV-O14 *D. Grödler, M. L. Weidemann, A. Lichtenberg, T. Greven, R. Nickstadt, M. Haydo, M. Wickleder, A. Klein, D. Johrendt, S. Mathur, M. Zegke, A. Raauf*
Heterobimetallic Uranyl(VI) Alkoxides of Lanthanoides: Trimerisation through simple ligand exchange
- 9.25 – 9.50 IV-O15 *R. Nicholls, C. Bell, R. Springell*
Structure and Phase Transformations of Metastable Hexagonal Uranium Thin Films
- 9.50 – 10.15 IV-O16 *V. Baumann, K. Popa, O. Walter, J.-F. Vigier, M. Rivenet, G. Senentz, B. Morel*
Production of nanometric sized PuO₂ by hydrothermal decomposition of Pu(IV) oxalate
- 10.15 – 10.40 IV-O17 *K. Stanistreet-Welsh, A. Kerridge*
Simulating Uranyl Oxygen K-edge XANES using Multiconfigurational RASSCF Methods
- 10.40 – 11.10 **Coffee break**

Session V – Physics 3

Chair: G. Lander

- 11.10 – 11.35 V-O18 *M. Osipenko, R. Caciuffo, R. Eloirdi, M. Giovannini, A. Kellerbauer, R. Malmbeck, S. Minutoli, M. Ripani, M. Taiut*
Search for gamma decay of ^{229m}Th isomer in ThF₄ crystal
- 11.35 – 12.00 V-O19 *M. Fedkevych, M. Biasotti, M. De Gerone, L. Ferrari Barusso, G. Gallucci, F. Gatti, M. Giovannini, M. Osipenko, M. Ripani, B. Siri*
Calorimetric measurement of ^{229m}Th decay with Transition Edge Sensor
- 12.00 – 12.25 V-O20 *G. Zwicknagl, E.-O. Eljaouhari*
Heavy quasiparticles in CeRh₂As₂: Renormalized bands, Fermi surfaces, and electronic instabilities
- 12.25 – 12.50 V-O21 *F. Pinna*
Overview on future Lanthanides targets in NUMEN Experiment
- 13.00 – 14.30 **Lunch**

14.30 – 17.50

Excursion**Poster II (oral presentation)****Chair: A. Martinelli**

18.00 – 18.02 P7 *D. A. Chaney*
 18.02 – 18.04 P8 *R. Freccero*
 18.04 – 18.06 P9 *A. P. Gonçalves*
 18.06 – 18.08 P10 *N. Anwar*
 18.08 – 18.10 P11 *F. Akbar*
 18.10 – 18.12 P12 *L. Horák*

18.15 – 19.30

Poster II (poster presentation)

P7

D. A. Chaney, *A. Korshunov*, *L. Paolasini*, *A. Bosak*
 Actinide Research at the ID28 Beamline ESRF

P8

R. Freccero, *P. Solokha*, *L. C. J. Pereira*, *S. De Negri*
 Crystal structure and chemical bonding of the Yb₂PdGe₃ superconductor: an ordered superstructure of AlB₂

P9

B. A. Santos, *G. Domingos*, *A. P. Gonçalves*
 Studying and developing Uranium Carbide-based systems for ISOLDE targets

P10

N. Anwar, *R. Harker*, *M. Storr*, *C.-K. Skylaris*
 Large-Scale Quantum Mechanical Simulations for Actinide Oxides containing Defects

P11

F. Akbar, *I. Čurlík*, *M. Reiffers*, *M. Giovannini*
 Phase equilibria and magnetic properties in the Yb-Cu-Zn system

P12

L. Horák, *E. A. Tereshina-Chitrova*, *L. Havela*, *M. Paukov*, *M. Dopita*, *O. Koloskova*, *Z. Šobáň*, *T. Gouder*, *F. Huber*, *A. Seibert*
 Strongly textured layers of U-Mo thin films characterized by X-ray diffraction techniques

20:00

Dinner

Wednesday 13 April 2022

Session VI – Physics 4

Chair: G. Zwicknagl

- 9.00 – 9.25 VI-O22 R. Caciuffo, T. Klimczuk, A. B. Shick, A.L. Kozub, K. K. Kolincio, J.-C. Griveau, E. Colineau, R. Eloird
Antiferromagnetism and large positive magnetoresistance in NpPt₂In₇
- 9.25 – 9.50 VI-O23 V. Buturlim, O. Koloskova, T. Košutová, A. V. Andreev, M. M. Celis, L. Havela
Magnetic and transport properties of U(Pt_xIr_{1-x})₂Si₂ compounds
- 9.50 – 10.15 VI-O24 M. S. Henriques, S. Ilkovic, I. Curlik, M. Reiffers, J. Rusz, A. P. Gonçalves
Ground state evolution in the UFe_xSb₂ system
- 10.15 – 10.40 VI-O25 D. Legut, L. Kývala, A. Kadzielawa, L. Havela
Non-collinear ferromagnetism in pure and alloyed β-UH₃
- 10.40 – 11.05 VI-O26 O. S. Válu, E. De Bona, K. Popa, J.-C. Griveau, E. Colineau, R.J.M. Konings
The effect of lattice disorder on the low-temperature heat capacity of the uranium-based fluorite dioxide systems

11.05 – 11.35

Coffee break

Session VII – Materials 2

Chair: P. Rogl

- 11.35 – 12.00 VII-O27 A. Martinelli, G. Lamura, F. Cagliaris, P. Solokha, A. Provino, A.K. Pathak, P. Manfrinetti, M. Pani, S.K. Dhar
Crystal structure study of the new MNi₆Si₆ compounds (M= Th, U)
- 12.00 – 12.25 VII-O28 M. Martinez Celis, E. A. Tereshina-Chitrova, L. Havela, M. Paukov, O. Koloskova, L. Horak, M. Dopita, M. Cieslar, P. Minarik, T. Gouder
Bulk and thin film Uranium hydrides studied by high-resolution electron microscopy

12.30

Conference Picture

13.00 – 14.30

Lunch

Session VIII – Environment, fuels

Chair: A. Gonçalves

- 14.30 – 14.55 VIII-O30 *B. Rami, N. Elgad, S. Maskova-Cerna, D. Micheli, J. Lorincik, I. Orion, I. Halevy*
Nuclear forensics – Fission track Analysis – Simulation and Image Analysis Including GEANT fission Simulation and AI Fission track recognition.
- 14.55 – 15.20 VIII-O31 *A. F. Holdsworth, H. Eccles, G. Bond, C. A. Sharrad*
Selective Separation of Resources in Used Nuclear Fuel Recycle for Fuel Cycle Sustainability
- 15.20 – 15.45 VIII-O32 *G. Porto, J. Bouchet, E. Bourasseau, P. Martin*
Thermodynamic properties of MOX by atomic-scale calculations and impact of irradiation effects
- 15.45 – 16.10 VIII-O33 *B. Labonne, S. Orlat, M. Bertolus*
Interatomic potential investigation of thermodynamic properties of Americium-bearing mixed oxides
- 16.10 – 16.35 VIII-O34 *G. L. Murphy, P. Kegler, M. Klinkenberg, A. Wilden, M. Henkes, D. Schneider, E. V. Alekseev*
Understanding Incorporation of Radionuclides into Spent Nuclear Fuel Alteration Phases

16.35 – 17.05

Coffee break

Session IX – 4th Generation Challenge

Chair: R. Caciuffo

- 17.05 – 17.50 IX-O35 *L. Cinotti, G. Grasso*
Newcleo's LFR-SMRs
- 17.50 – 18.15 IX-O36 *G. Firpo, M. Frignani*
ALFRED Project: Status and next activities
- 18.15 – 18.40 IX-O37 *F. Panza, P. Agostinetti, C. Bustreo, A. Cemmi, N. Chrubini, M. Ciotti, G. Lomonaco, M. Osipenko, R. Piovan, G. Ricco, M. Ripani*
Actinides based fuels for ADS and FFHS

19.15 – 20.00

Bus to Camogli

20.30 – 22.00

Conference Dinner

Thursday 14 April 2022

Session X – Physics 5

Chair: E. Colineau

9.00 – 9.25 X-O38 *D. A. Chaney, A. Castellano, A. Bosak, J. Bouchet, F. Bottin, B. Dorado, L. Paolasini, S. Rennie, C. Bell, R. Springell, G. H. Lander*

Tuneable Correlated Disorder and Disorder-Phonon Coupling in the Pseudo-bcc Uranium Molybdenum System γ -(U_{1-x}Mo_x)

9.25 – 9.50 X-O39 *A. Provino, P. Manfrinetti, Amitabh Das, Indu Dhiman, S.K. Dhar*

Room-temperature ferromagnetism in the new UNi₄Mn compound

9.50 – 10.15 X-O40 *J-C. Griveau, É. Colineau, A. Guiot, D. Bouéxiere*
 Low temperature Heat Capacity of single Crystal NpBe₁₃

10.15 – 10.40 X-O41 *M. Au, D. Atanasov, M. Athanasakis-Kaklamanakis, J. Ballof, E. Barbero, R. Berger, M. Bovigny, K. Chrysalidis, B. Crepieux, J. Cruikshank, S. Geldhof, R. Heinke, J. Johnson, D. Leimbach, E. Mamis, B. Marsh, M. Mougeot, L. Nies, B. Reich, E. Reis, S. Stegemann, Y. Nel Vila Gracia, J. Wessolek, S. Wilkins, C. Düllmann, S. Rothe*

Beam developments for actinides at CERN-ISOLDE

10.40 – 11.10

Coffee break

Closing Session

11.10 – 11.35

JdA Awards

11.35 – 12.00

Conference Summary (Physics, 4th Generation) *R. Caciuffo*

12.00 – 12.25

Conference Summary (Chem, Mater, Environ) *I. Halevy*

12.25 – 13.00

Concluding Remarks

13.00

Lunch