TIME TABLE

TIME

Monday
June 11
9.00 - 9.45
Registration
Kaplunov

Tuesday
June 12
9.45 - 10.30
Karp

Wednesday
June 13
11.00 - 11.45
Pagneux

Thursday
June 14
11.45 - 12.30
Guenneau

Friday
June 15
14.00 - 14.45
Steigman

9.00 - 9.45
Kaplunov

9.45 - 10.30
Karp

11.00 - 11.45
Pagneux

11.45 - 12.30
Guenneau

14.00 - 14.45
Steigman

14.45 - 15.30
Guenneau

16.00 - 16.45
Karp

16.45 - 17.30
Steigman

17.30 - 18.15
Pagneux

ADMISSION AND ACCOMMODATION

Applicants must contact CISM Secretariat at least one month before the beginning of the course. Application forms should be sent on-line through our web site: http://www.cism.it or by post.

A message of confirmation will be sent to accepted participants. If you need assistance for registration please contact our secretariat.

The 700.00 Euro registration fee includes a complimentary bag, four fixed menu buffet lunches (Friday not included), hot beverages, on-line/downloadable lecture notes and wi-fi internet access.

A limited number of participants from universities and research centres who are not supported by their own institutions can be offered board and/or lodging in a reasonably priced hotel. Requests should be sent to CISM Secretariat by April 11, 2012 along with the applicant’s curriculum and a letter of recommendation by the head of the department or a supervisor confirming that the institute cannot provide funding. Preference will be given to applicants from countries that sponsor CISM.

Information about travel and accommodation is available on our web site, or can be mailed upon request.

For further information please contact:

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Piazza Garibaldi 18
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e-mail: cism@cism.it
A revolution is currently occurring in physics and through the manufacture and application of smart structures with designer microstructure. Many of the applications: cloaking, invisibility, trapped and defect modes, resonances, ultra-refraction, all-angle-negative refraction, wave guiding along surfaces depend upon subtle properties of wave localization and are ubiquitous across several fields: examples will be drawn from elasticity, acoustics and electromagnetism. There are also numerous applications in more traditional fields such as the Non-Destructive Evaluation and Testing of structures. For example, prestresses or coatings on elastic media can be used to manipulate surface and edge waves, and localized modes arise in coated or deformed waveguides and are modified by fluid flow. In addition, surface and guided waves play a key role in crack and flaw detection and a knowledge of surface and resonant modes is invaluable. Recent work has highlighted how localized defect modes arise in microstructured media and new homogenization theories can be used to create continuum descriptions of micromechanical systems, even at high frequencies. The aim of the course is to introduce an interdisciplinary audience into a variety of interrelated dynamic localisation phenomena occurring in elasticity, acoustic and electromagnetic. In particular, these involve surface, edge waves and also trapped modes localised near defects, shape changes and the edges of elongated waveguides. The effects of layering, prestress, anisotropy, periodic microstructures as well as various multi-field phenomena are addressed with referencing to underlying industrial problems.

The course will provide a unique opportunity to learn simultaneously a wide range of subjects/techniques related to dynamic localisation phenomena. In particular, these include asymptotic and perturbation methods, modern homogenization methodologies, variational methods, basics of non-linear elasticity, the general theory of surface waves, multimodal approach, and advanced applications of Saint Venant principle. The objective of the lectures is to cover the essential and up to date numerical, asymptotic, and analytical techniques as well as relevant continuum theories that are required to make progress in, and understand, wave localization and allied effects. A major focus will be on a qualitative physical insight into the mechanisms of dynamic localisation.

The lectures are chosen to appeal to researchers, primarily but not exclusively graduate students and postdoctoral researchers, from Mechanical, Aerospace and Civil Engineering programs and will naturally also be of interest to Physicists and Applied Mathematicians and will focus on recent work in localized modes and waves that are unlikely to appear in previous university graduate courses; the lectures are also suitable for industrial researchers who encounter resonant or localised waves. The topics explore the applications in Engineering and Physics, notably in photonics, showing the interconnections with acoustics and elasticity, that are now treated independently. Both theoreticians and experimentalists are expected to gain useful knowledge from attending the course.

PRELIMINARY SUGGESTED READINGS

L. Brillouin, Wave propagation in periodic systems, Dover, 1953
Linton, C.M. & Melvin, P. Embedded trapped modes in water waves and acoustics. Wave Motion, 45, 16-29 (2007).
P. Chadwick, Surface and interfacial waves of arbitrary form in isotropic elastic media. - Elasticity 6 (1976), 73-80.
A.N. Norris, V.V. Krylov, and I.D. Abrahams, Flexural edge waves and comments on A new bending wave solution for the classical plate equation. ~ JASA (2000), 1781-1785.

LECTURES

Richard Craster - Imperial College, London, UK
6 lectures on: High frequency homogenization in periodic structured media. Introduction to Floquet-Bloch waves; Models from solid state physics and structural mechanics; Localized defect states and modes; Review of conventional low frequency homogenization; High frequency modelling; Localized forcing.

Sebastien Guenneau - Aix-Marseille University, France
6 lectures on: Locally resonant structures in electromagnetism and elastodynamics. Electromagnetic metamaterials; Transformation optics for invisibility cloaks and twisted waveguides; Plasmonics and structured surfaces. Acoustic metamaterials; Localised modes in arrays of split ring resonators; Phononic band gap guidance in arrays of elastic fibers; Transformation elastodynamics for flexural waves.

Julius Kaplunov - Brunel University, Uxbridge, UK
6 lectures on: Explicit models for surface and edge elastic waves. The focus is on the asymptotic derivations and applications of the dual hyperbolic-elliptic formulations specialised for the elastic wave motions localised near surfaces and interfaces. Pre-stressed, anisotropic, electroelastic and coated solids are considered. Analogous parabolic-elliptic models for edge flexural waves on thin elastic plates are also discussed.

Baruch Karp - Ben-Gurion University of the Negev, Beer-Sheva, Israel
6 lectures on: Dynamic St Venant Principle. Review of classical St Venant principle (SVP); Early ideas on dynamic SVP; Experimental evidence for validity of DSVP; End effects in waveguides with free lateral surfaces; Constrained waveguides including energy leaking surfaces; Half-space and wedge geometries; Composites and lami-nates: Beyond linear elasticity. Open questions in formulating DSVP.

Vincent Pagneux - Université Marseille, La Mâns, France
6 lectures on: Edge and trapped modes in elasticity. Review of trapped modes for scalar waves; Multimodal method; Edge waves due to impendence; Elastic vector waves; Multimodal method with numerical modes; Complex resonances and trapped modes at free edges; 2D and 3D plate models; Consequences of edge modes in closed cavity.

David Steigmann - University of California at Berkeley, CA, USA

All lectures will be given in English. Lecture notes can be downloaded from CISM web site, instructions will be sent to accepted participants.
Surname ____________________________________________
Name ____________________________________________
Affiliation ________________________________________
Address __________________________________________
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E-mail ____________________________________________
Phone __________________ Fax______________________

Method of payment upon receipt of confirmation (Please check the box)

☒ I shall send a check of Euro _________________________

☒ Payment will be made to CISM - Bank Account N° 094570210900,
VENETO BANCA - Udine (CAB 12300 - ABI 05035 - SWIFT/BIC VEBHIT2M -
IBAN CODE IT46 N 05035 12300 09457 0210900).
Copy of the receipt should be sent to the secretariat

☒ I shall pay at the registration counter with check, cash or VISA
Credit Card (Mastercard/Eurocard, Visa, CartaSì)

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indicate to whom the invoice should be addressed.

Name _________________________________________________________________________________________
Address _______________________________________________________________________________________
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(*) Only for EU residents or foreigners with a permanent business activity in Italy.

Only for Italian Public Companies
☒ I ask for IVA exemption (ex law n. 537/1993 - art. 14 comma 10).

Privacy policy: I understand that data received via this form will be used only to provide
information about CISM and its activities, within the limits set by the Italian legislative
decree no. 196/2003 and subsequent amendments.
Complete information on CISM’s privacy policy is available at http://www.cism.it/courses/
privacy_statement/

I have read the "Admission and Accommodation" terms and conditions and agree.

Date ____________________ Signature