

10th International Symposium on Radiative Transfer

RAD-23 • Grand Hotel Palace, Thessaloniki, Greece

12 - 16 June 2023

PROGRAM

SUNDAY JUNE 11, 2023

15:30 - 18:00 REGISTRATION

MONDAY JUNE 12, 2023

7:30 – 8:30 REGISTRATION

8:30 – 8:55 WELCOMING REMARKS (B. W. Webb / D. Lemonnier/ I. Tari)

DEDICATION LECTURE 1

Chair: M. P. Mengüç

8:55 – 9:45 KIRCHHOFF'S LAW OF THERMAL RADIATION: THE ORIGIN, GENERALIZATION, AND NEW INTERPRETATION
Z. Zhang

SESSION 1 – NANOSCALE RADIATIVE TRANSFER – I

Chair: H. Ertürk

9:45 – 10:10 INVESTIGATING THE ABSORPTION PROPERTIES OF METAL NANOPARTICLE AGGREGATES DURING TIME-RESOLVED LASER-INDUCED INCANDESCENCE
S. Robinson-Enebeli, C. Schulz, K. J. Daun

10:10 – 10:35 Coffee Break

10:35 – 11:00 CIRCULARLY POLARIZED THERMAL RADIATION IN α -MoO₃/ β -Ga₂O₃ TWISTED LAYERS
M. Centini, C. Yang, M. C. Larciprete, M. Antezza, Z. M. Zhang

11:00 – 11:25 LIGHT AND THERMAL EFFECTS INDUCED FORCES IN THE LIGHT-NANOPARTICLE INTERACTION PROCESS
Y. Ji, Y. Ren, Y. Wang, B. Gao, M. He, H. Qi

11:25 – 11:50 EFFECTIVE PROPERTIES OF RESONANT NANOPARTICLE SUSPENSIONS: IMPACT OF THE ELEMENTARY VOLUME SHAPE
T. Guerra, I. Gonzalez de Arrieta, O. Rozenbaum, C. Blanchard

11:50 – 12:15 MANY-BODY INTERACTION ON NEAR-FIELD RADIATIVE HEAT TRANSFER IN THREE-PARTICLE SYSTEM: ENHANCEMENT AND INHIBITION
M. Luo, J. Zhao, L. Liu, M. Antezza

12:15 – 13:45 LUNCH BREAK

SESSION 2 – INVERSE RADIATIVE TRANSFER – I

Chair: P. J. Coelho

13:45 – 14:10 A MONTE CARLO RANDOM WALK-BASED METHODOLOGY FOR CALCULATION OF SENSITIVITY COEFFICIENTS IN INVERSE RADIANT BOUNDARY DESIGN PROBLEM
E. Yıldız, A. M. Başol, M. P. Mengüç

14:10 – 14:35 A PHYSICS INFORMED NEURAL NETWORK FOR RETRIEVING TWO-DIMENSIONAL SCALAR FIELDS OF LAMINAR DIFFUSION FLAMES
H. Li, T. Ren

14:35 – 15:00 A BAYESIAN ERROR MODEL FOR MEASURING METHANE AND CARBON DIOXIDE CONCENTRATIONS FROM HYPERSPECTRAL MEASUREMENTS
P. Lapeyre, R.B. Miguel, M.C. Nagorski, M. Bonharens, A. Kaveh, K. J. Daun

15:00 – 15:50 Coffee Break

SESSION 3 – GAS RADIATION - I

Chair: T. Ren

15:50 – 16:15 APPLICATION OF THE Γ -THEORY FOR THE CONSTRUCTION OF SPECTRAL MODELS OF ATMOSPHERIC GASES WITH ADJUSTABLE ACCURACY OVER NON-UNIFORM PATHS
F. André, V.P. Solovjov, B.W. Webb, M. Compiègne, P. Dubuisson, L.-C. Labonnote

16:15 – 16:40 THE SPECTRAL GAS ABSORPTION FUNCTION GAMMA AND ITS APPLICATION TO ANALYSIS OF THE RC-SLW MODEL
V. P. Solovjov, F. André, B.W. Webb

16:40 – 17:05 ON THE COMPROMISE BETWEEN ACCURACY AND COMPUTATIONAL COST FOR DIFFERENT GLOBAL SPECTRAL MODELS
S. Rashidzadeh, G. C. Fraga, H. Bordbar, S. Hostikka

17:05 – 17:30 AN EXTENSION OF THE WIDE-BAND BASED WEIGHTED-SUM OF-GRAY-GASES MODEL TO HIGH PRESSURE CONDITIONS
R. J. C. Da Fonseca, G. C. Fraga, F. Asllanaj, F. H. R. França

17:30 – 17:55 COMPARISONS BETWEEN THE SRI AND NBCK METHODS IN HIGH TOTAL PRESSURE H₂O AND CO₂ MIXTURES
F. R. Coelho, G. C. Fraga, S. P. Roy, F. H. R. França

18:30 – 20:00 WELCOME COCKTAIL

TUESDAY JUNE 13, 2023

DEDICATION LECTURE 2

Chair: M. F. Modest

8:30 – 9:20 MACHINE LEARNING APPROACHES TO INVERSE RADIATIVE TRANSFER
S. Kumar

SESSION 4 – RADIATIVE TRANSFER IN INDUSTRIAL AND COMBUSTION SYSTEMS – I

Chair: M. F. Modest

9:20 – 9:45 EFFECT OF THERMAL RADIATION ON H₂-AIR FLAMES DILUTED WITH STEAM
J. Ben Zenou, R. Vicquelin

9:45 – 10:10 INVESTIGATION OF SOOT FORMATION OF ETHYLENE/AIR JET DIFFUSION FLAME
WITH RANK CORRELATED SLW INCLUDING ETHYLENE AND ACETYLENE RADIATION
B. Halvaşı, A. M. Başol, M. P. Mengüç, Ö. Ertunç

10:10 – 10:35 Coffee Break

SESSION 5 – RADIATIVE TRANSFER IN INDUSTRIAL AND COMBUSTION SYSTEMS – II

Chair: F. Liu

10:35 – 11:00 MEDIUM RESOLUTION (0.25 CM⁻¹) SPECTRUM OF A HYDROGEN FLAME USING
IMAGING FOURIER TRANSFORM SPECTROSCOPY (IFTS) AND ITS INVERSION BY THE
ℓ-DISTRIBUTION APPROACH
G. Parent, F. André, M. Kuhni, Z. Acem, M. Norman, E. Bodin, C. Galizzi

11:00 – 11:25 BENCHMARK RADIATION MODELING DATA FOR TWO FLAMES RELEVANT TO FIRE
SIMULATION
C. Paul, S. Roy, J. Sailer, F. Brännström, M. Mohsen Ahmed, A. Trouvé, H. Bordbar,
S. Hostikka, R. McDermott

11:25 – 11:50 EXPERIMENTAL STUDY OF THE RADIATIVE HEAT FLUX DURING WATER MIST FIRE
SUPPRESSION IN AN ENGINE COMPARTMENT
S. F. Junjunan, K. Chetehouna, A. Cablé, A. Robinet, S. Hamidouche, N. Gascoin,
A. Oger

11:50 – 12:15 THE ROLE OF THERMAL RADIATION FOR THE COMPLEX HEAT AND MASS
PROCESSES INTERACTION IN PHASE CHANGE TRANSIENT REGIME OF WATER
DROPTS IN FLUE GAS FLOW
M. Maziukiene, G. Miliauskas, E. Puida

12:15 – 13:45 LUNCH BREAK

SESSION 6 – NON-HOMOGENEOUS STRUCTURES AND OPTICALLY COMPLEX MEDIA – I

Chair: S. Haussener

13:45 – 14:10 DETERMINISTIC AND STOCHASTIC APPROACHES FOR THE MODELING OF CONDUCTION-RADIATION COUPLING WITHIN NON-BEERIAN SEMI-TRANSPARENT MEDIA

L. Seyer, F. Enguehard, D. Rochais

14:10 – 14:35 ESTIMATION OF THE SCATTERING PHASE FUNCTION OF AEROSOL PARTICLES BASED ON MOBILITY SIZE DISTRIBUTION AND SINGLE SCATTERING ALBEDO OR ABSORPTION COEFFICIENT

F. Liu, J. C. Corbin, G. J. Smallwood

14:35 – 15:00 DEPENDENT SCATTERING IN SILICA AMBIGEL MONOLITHS – EXPERIMENTS AND SIMULATIONS

R. A. Yalcin, P. E. McNeil, G. N. Kashanchi, R. Martinez, S. H. Tolbert, B. S. Dunn, L. Pilon

15:00 – 15:25 EXPERIMENTAL DETERMINATION OF RADIATIVE PROPERTIES OF SEMI-TRANSPARENT COMPOSITE MATERIALS WITH ROUGH BOUNDARIES

F. Retailleau, V. Allheily, L. Merlat, J-F. Henry, J. Randrianalisoa

15:25 – 15:50 Coffee Break

SESSION 7 – SOLUTION METHODS FOR RADIATIVE AND COUPLED TRANSFERS – I

Chair: B. W. Webb

15:50 – 16:15 MODELING SOLAR HEATING OF ICE-COVERED LAKE AND ICE MELTING

L. A. Dombrovsky, A. A. Kokhanovsky

16:15 – 16:40 NARROW BAND-WISE IDENTIFICATION OF TURBULENCE-RADIATION INTERACTION IN RESOLVED AND SUBFILTER SCALES

G. C. Fraga, P. J. Coelho, X. Zhao

16:40 – 17:05 A MONTE CARLO APPROACH FOR BRAIN FUNCTIONAL MAPPING

O. Said, M. Galtier, L. Mahieu Williams, B. Montcel, M. Roger

17:05 – 17:30 A MODIFIED KUBELKA–MUNK FOUR-FLUX MODEL FOR UV–VIS–NIR SPECTRAL REFLECTANCE OF A PARTICLE–INCLUSION FILM

Z. Huang, L. Long, H. Ye, M. Liu

17:30 – 17:55 CONDUCTION-RADIATION HEAT TRANSFER IN NON-GRAY SEMITRANSPARENT MEDIA: COMBINING INTEGRAL TRANSFORMS AND DISCRETE ORDINATE METHOD

J. V. L. Oliveira, Z. E. Silva, J. A. Lima

WEDNESDAY JUNE 14, 2023

KEYNOTE LECTURE 1

Chair: L. Dombrovsky

8:30 – 9:20 RADIATION, THE FUNDAMENTAL DRIVER OF CLIMATE AND CLIMATE CHANGE

J. L. Dufresne

SESSION 8 – RADIATIVE TRANSFER IN CLIMATE AND ENERGY RELATED PROBLEMS - I

Chair: L. Dombrovsky

9:20 – 9:45 MODELLING FRAMEWORK OF RADIATIVE TRANSFER IN LUMINESCENT SOLAR CONCENTRATORS

S. Li, S. Haussener

9:45 – 10:10 RADIATIVE HEAT TRANSFER IN SOLAR PARTICLE RECEIVERS

J. Chen, A. Kumar, J. Coventry, W. Lipinski

10:10 – 10:35 Coffee Break

SESSION 9 – GAS RADIATION - II

Chair: S. P. Roy

10:35 – 11:00 MODELLING RADIATIVE PROPERTIES OF GAS MIXTURES IN NONEQUILIBRIUM HIGH-ALTITUDE ROCKET PLUMES

G. Janodet, P. Rivière, J.-M. Lamet, V. Rialland, L. Tessé, A. Soufiani

11:00 – 11:25 A MACHINE LEARNING-BASED GREY GAS EMISSIVITY MODEL FOR H₂O-CO₂-CO-N₂ MIXTURES

W. Chen, T. Ren

11:25 – 11:50 A SIMPLIFIED ω -ALDF RANK-CORRELATED FULL-SPECTRUM k -DISTRIBUTION MODEL FOR COMBUSTION APPLICATIONS

J. L. Consalvi, F. Nmira, F. André, V. P. Solovjov, B. W. Webb

11:50 – 12:15 EVALUATION OF NEW ALBDF FUNCTIONS BASED ON H₂O AND CO₂ MIXTURES FOR VARIABLE MOLE FRACTION RATIO USING THE TWO-WAY ANOVA ANALYSIS

L. G. P. Rodrigues, F. R. Coelho, A. Krummenauer, V. C. Nardelli, F. H. R. França

12:15 – 13:45 LUNCH BREAK

FREE AFTERNOON

THURSDAY JUNE 15, 2023

KEYNOTE LECTURE 2

Chair: W. Lipinski

8:30 – 9:20 RADIATIVE TRANSFER IN SOLAR ENERGY CONVERSION
S. Haussener

SESSION 10 – RADIATIVE TRANSFER IN CLIMATE AND ENERGY RELATED PROBLEMS - II

Chair: W. Lipinski

9:20 – 9:45 BRIDGING PHYSICS AND STATISTICAL LEARNING METHODOLOGIES FOR THE ACCURATE MODELING OF THE RADIATIVE PROPERTIES OF NON-UNIFORM ATMOSPHERIC PATHS
F. André, C. Delage, L. Guilnard, M. Galtier, C. Cornet

9:45 – 10:10 MONTE-CARLO AND SENSITIVITY TRANSPORT MODEL: APPLICATION IN SOLAR ENERGY
Z. He, P. Lapeyre, S. Blanco, S. Ebner, M. El Hafi, R. Fournier

10:10 – 10:35 Coffee Break

SESSION 11 – NON-HOMOGENEOUS STRUCTURES AND OPTICALLY COMPLEX MEDIA – II

Chair: F. Enguehard

10:35 – 11:00 EXPERIMENTAL VALIDATION OF MODELS FOR RADIATION TRANSFER THROUGH SEMITRANSSPARENT MEDIA CONTAINING LARGE GAS BUBBLES
A. Bhanawat, R. A. Yalcin, R. Martinez, L. Pilon

11:00 – 11:25 DEPENDENT SCATTERING PREVAILS IN NANOEMULSIONS
R. Martinez, A. Bhanawat, R. A. Yalcin, L. Pilon

11:25 – 11:50 IMPACT OF THE EXTINCTION BEHAVIOUR OF SIC LATTICES ON THEIR CONDUCTIVE-RADIATIVE HEAT TRANSFERS
B. Rousseau, S. Ouchtout, L. Cangémi, Y. Favennec, J. Vicente, F. Enguehard

11:50 – 12:15 EVALUATION OF THE ONSET OF DEPENDENT SCATTERING IN SPHERICAL PARTICULATE MEDIUM USING SUPERPOSITION T-MATRIX METHOD
A. Taufiq, R. A. Yalçın, H. Ertürk

12:15 – 13:45 LUNCH BREAK

SESSION 12 – INVERSE RADIATIVE TRANSFER – II

Chair: S. Kumar

13:45 – 14:10 ARTIFICIAL NEURAL NETWORKS FOR INTERPRETING SPECTRAL EMISSIVITY VARIATIONS ACROSS COLD-ROLLED AHSS COILS

N. S. Narayan, F. K. Suleiman, W. M. Prada, M. Zijderwijk, K. J. Daun

14:10 – 14:35 CONTROLLING THE ENZ PROFILE FOR BROADBAND NONRECIPROCAL THERMAL EMITTERS WITH HIGH CONTRAST BETWEEN EMISSIVITY AND ABSORPTIVITY

C. Du, B. Zhao

14:35 – 15:00 ESTIMATING RADIATIVE PROPERTIES IN ARBITRARY POROUS MEDIA USING CASE-SPECIFIC DATA – DRIVEN MACHINE LEARNING FRAMEWORKS

F. Tabassum, A. Eghesad, G. R. Domenikos, S. Hajimirza

15:00 – 15:25 IDENTIFICATION OF FOG PARTICLE SIZE DISTRIBUTION BY A RADIATIVE TRANSFER EQUATION INVERSION

A. Krayem, F. Bernardin, A. Münch

15:25 – 15:50 Coffee Break

15:50 – 18:00 **POSTER SESSION**

20:00 - 23:00 GALA DINNER

FRIDAY JUNE 16, 2023

POYNTING AWARD LECTURE

Chair: M. P. Mengüç

8:30 – 9:20 LECTURE DELIVERED BY THE RECIPIENT OF THE ELSEVIER POYNTING AWARD

SESSION 13 – RADIATIVE TRANSFER IN CLIMATE AND ENERGY RELATED PROBLEMS - III

Chair: B. Rousseau

9:20 – 9:45 NANOPATTERNED SILICON PHOTOVOLTAIC CELLS OPTIMIZED FOR NARROWBAND SELECTIVE REFLECTIVITY

E. E. Atak, E. B. Elçioğlu, T. O. Özyurt

9:45 – 10:10 IMPACT OF THE SPECTRAL COUPLING BETWEEN NON-GRAY SKY BOUNDARY CONDITIONS AND A URBAN ATMOSPHERE IN THE CALCULATION OF NET FLUXES IN A STREET CANYON

F. Schmitt, M. Galtier, L. Merlier, E. Vergnault, F. André

10:10 – 10:35 Coffee Break

10:35 – 11:00 ESTIMATING ATMOSPHERIC RADIATIVE FORCINGS USING SENSITIVITY MONTE CARLO METHODS

N. C. Mourtaday, M. Bati, S. Blanco, J. L. Dufresne, M. El Hafi, V. Eymet, R. Fournier, J. Gautrais, P. Lapeyre, N. Mellado, Y. Nyffenegger-Péré, M. Paulin, N. Villefranque

11:00 – 11:25 PASSIVE NIGHTTIME RADIATIVE COOLING USING BLACK SILICON

A. Hervé, T. Bourouina, G. Hamaoui, P. Basset, E. Nefzaoui

SESSION 14 – NANOSCALE RADIATIVE TRANSFER – II

Chair: Z. Zhang

11:25 – 11:50 DESIGN AND SPECTRAL ABSORPTION CHARACTERISTICS OF METAMATERIAL SOLAR ABSORBER BASED ON MXENE MATERIAL

W. Zhang, H. Qi, M. He

11:50 – 12:15 EXPERIMENTAL STUDY OF NEAR-FIELD HEAT TRANSFER BETWEEN TWO SiO₂ FILMS ON SILICON SUBSTRATE

S. Li, D. Xu, J. Zhao, L. Liu

12:15 – 13:45 LUNCH BREAK

13:45 – 14:15 CLOSURE

14:15 END OF RAD-23 SYMPOSIUM

POSTER PRESENTATIONS

Thursday, June 15

15:50 – 18:00

- P02 SPECTRAL TRANSMITTANCE MEASUREMENT OF WATER MIST FROM DUAL FLUID NOZZLE IN INFRARED REGION
H. Gonome, K. Suzuki, Y. Takagi, S. Moriya
- P03 BRIDGING PHYSICS AND STATISTICAL LEARNING METHODOLOGIES FOR THE ACCURATE MODELING OF THE RADIATIVE PROPERTIES OF NON-UNIFORM ATMOSPHERIC PATHS - APPLICATION TO CHANNEL 7 OF EPS-SG 3MI
C. Delage, F. André, L. Guilmard, M. Galtier, C. Cornet, Ph. Dubuisson
- P06 OPTICAL FIBER/SPECTROMETER MEASUREMENT OF TRANSIENT THERMAL RADIATIVE DATA IN AN OPERATING SOLID ROCKET MOTOR
E. H. VandenBosch, C. J. Allen, S. J. Petersen
- P07 A QUASI MONTE CARLO SOLVER FOR GAS RADIATION USING δ -DISTRIBUTION MODEL
S. P. Roy, F. André
- P08 ACCELERATION OF MONTE CARLO RAY TRACING IN PARTICIPATING MEDIA USING GRAPHICS PROCESSING UNITS AND BOUNDING VOLUME HIERARCHIES
N. Tricard, X. Zhao
- P09 SMART THERMAL CONTROL SKIN ASSISTED BY ELECTRICALLY TUNNING NEAR-FIELD PHOTON TUNNELLING
D. Xu, J. Zhao, L. Liu
- P10 A COLOR-CHANGING BIOMIMETIC MATERIAL SUMULATING THE UV-VIS-NIR SPECTRUMS AND THERMAL INFRARED CHARACTERISTICS OF PLANT LEAVES
Z. Huang, L. Long, H. Ye, M. Liu
- P11 ENHANCEMENT OF INFRARED EMISSIVITY OF SILICON NITRIDE THIN FILMS BY INDUCING METALLIC PHASES VIA TITANIUM THERMAL DIFFUSION
R. Sebastian, A. Amnache, M. Biron, S. Loquai, A. Dompierre, A. S. Rollier, L. G. Fréchette
- P12 DEVELOPMENT OF SELF-CONTROLLED COATINGS FOR SPECTRAL REFLECTANCE USING PNIPAM GELS
T. Takahashi, H. Tomori, H. Gonome
- P13 NUMERICAL SIMULATION OF ENERGY TRANSFER FROM ULTRASHORT PULSE WAVE TO ELECTRON AND LATTICE
M. Ono, A. Komiya, H. Gonome

- P15 INTERPRETATION AND DETERMINATION OF MUELLER MATRIX USING PARTIAL POLARIMETRY
C. Yang, W. Cai, Z. Zhang
- P16 RADIATIVE TRANSFER IN A SEMI-TRANSPARENT CAVITY WITH REFLECTING SURFACES AND A CENTRED OBSTACLE
V. Le Dez, M. Lazard