

8th International Symposium on Radiative Transfer

RAD-16 • Dilek Kaya and Burcu Kaya Hotels, Cappadocia, Turkey

6 - 10 June, 2016

SUNDAY JUNE 5, 2016

15:30 - 18:00 REGISTRATION

MONDAY JUNE 6, 2016

7:30 – 9:00 REGISTRATION

9:00 – 9:30 WELCOMING REMARKS (B.W. Webb / D. Lemonnier/ F. Arinç)

SESSION 1 – NANOSCALE RADIATIVE TRANSFER – I

Chair: L. Wang

9:30 – 10:00 THE BREAKDOWN OF EFFECTIVE MEDIUM THEORY IN MULTILAYERED
HYPERBOLIC MATERIALS

R. Z. Zhang, Z. M. Zhang

10:00 - 10:30 EFFECT OF SILICON AFM PROBE LOCATION ON ABSORPTION PROFILE OF GOLD
NANO-STRUCTURES ON A DIELECTRIC SURFACE

S. T. Moghaddam, H. Ertürk, M. P. Mengüç

10:30 - 11:00 Coffee Break

SESSION 2 – NANOSCALE RADIATIVE TRANSFER – II

Chair: Z. Zhang

11:00 - 11:30 NEAR-FIELD COUPLING OF A NANOSTRUCTURED METAMATERIAL WITH A
GRAPHENE-COVERED PLATE

J. Y. Chang, Y. Yang, L. Wang

11:30 - 12:00 ELECTRICALLY-CONTROLLED NEAR-FIELD RADIATIVE THERMAL MODULATOR

Y. Yang, L. Wang

12:00 - 12:30 INTRODUCTION OF MULTILAYERED GRAPHENE FOR THE PRACTICAL APPLICATION
OF NEAR-FIELD THERMOPHOTOVOLTAIC SYSTEM WITH ENHANCED
PERFORMANCE

M. Lim, S. S. Lee, B. J. Lee

12:30 - 14:00 LUNCH BREAK

KEYNOTE LECTURE 1

Chair: S. Maruyama

14:00 - 15:00 RADIATIVE PROPERTIES OF MATERIALS FOR RADIATIVE COOLING APPLICATIONS
M. P. Mengüç

SESSION 3 – RADIATIVE TRANSFER IN SOLAR ENERGY SYSTEMS

Chair: S. Haussener

15:00 - 15:30 AN ESTIMATE OF A SOLAR PROBE PROTECTION FROM INTENSE RADIATION WITH
THE USE OF PARTICLES EMBEDDED IN AN ABLATING MATERIAL
L. A. Dombrovsky, D. L. Reviznikov

15:30 - 16:00 A DYNAMIC HEAT TRANSFER MODEL TO INVESTIGATE THE EFFECT OF APERTURE
SIZE ON THE TEMPERATURE OF A SOLAR RECEIVER
H. A. Najafabadi, N. Ozalp

16:00 - 16:30 Coffee Break

16:30 - 17:00 TOWARDS NANO-SCALE THERMOPHOTOVOLTAIC APPLICATIONS: DISCUSSIONS
FOR MATERIAL SELECTION AND MEASURING SYSTEM
T. Okutucu-Özyurt, E. B. Elçioğlu, R. Denker, A. Didari, M. P. Mengüç

17:00 - 17:30 SPECTRALLY SELECTIVE Si/SiO₂ BASED FILTERS FOR THERMOPHOTOVOLTAIC
DEVICES
F. K. Khosroshahi, H. Ertürk, M. P. Mengüç

18:30 – 20:00 WELCOME COCKTAIL

TUESDAY JUNE 7, 2016

DEDICATION LECTURE 1

Chair: M. F. Modest

9:00 – 10:00 THERMAL RADIATION CHARACTERISTICS IN COMBUSTION
S. W. Baek

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

Chair: B. W. Webb

10:00 - 10:30 MONTE CARLO MODELING OF RADIATIVE TRANSFER IN A PULVERIZED COAL JET
FLAME
B. Wu, S. P. Roy, M. F. Modest, X. Zhao

10:30 - 11:00 Coffee Break

11:00 - 11:30 MULTIPHASE RADIATIVE HEAT TRANSFER CALCULATIONS IN HIGH-PRESSURE
SPRAY COMBUSTION SIMULATIONS
S. P. Roy, W. Ge, J. Cai, M. F. Modest

11:30 - 12:00 EFFECTS OF RADIATIVE PROPERTY MODELS AND TURBULENT RADIATION
INTERACTION ON FLAME STRUCTURE AND RADIATIVE HEAT TRANSFER IN
OXYGEN-ENRICHED SOOTING TURBULENT JET FLAMES
J.-L. Consalvi, F. Nmira, F. Liu

12:00 - 12:30 CALCULATIONS OF RADIATIVE HEAT TRANSFER IN AN AXISYMMETRIC JET
DIFFUSION FLAME AT ELEVATED PRESSURES USING DIFFERENT METHODS
H. Chu, J.-L. Consalvi, M. Gu, F. Liu

12:30 - 14:00 LUNCH BREAK

KEYNOTE LECTURE 2

Chair: L. A. Dombrovsky

14:00 - 15:00 RADIATIVE HEAT TRANSFER IN HIGH-TEMPERATURE SOLAR THERMAL
APPLICATIONS
W. Lipiński

SESSION 5 – INVERSE RADIATIVE TRANSFER

Chair: V. P. Solovjov

15:00 – 15:30 LASER-INDUCED INCANDESCENCE MEASUREMENTS OF SILICON AND COPPER
NANOPARTICLES: SPECTROSCOPIC MODEL

K. Daun, J. Menser, R. Mansmann, T. Dreier, C. Schulz

15:30 – 16:00 OPTICAL DETERMINATION OF TEMPERATURE AND CONCENTRATIONS FOR
LAMINAR AND TURBULENT GAS MIXTURES

T. Ren, M. F. Modest

16:00 - 16:30 Coffee Break

16:30 - 17:00 APPLICATION OF THE INVERSE ANALYSIS TO DETERMINE THE PARAMETERS OF
THE WEIGHTED-MULTI-POINT-SOURCE MODEL FOR TURBULENT DIFFUSION
FLAMES

R. B. Miguel, B. Schaefer, F. M. Pereira, P. R. Pagot, F. H. R. França

17:00 - 17:30 INVERSE CHARACTERIZATION OF NANOPARTICLE CLUSTERS USING UNPOLARIZED
OPTICAL SCATTERING WITHOUT EX-SITU MEASUREMENTS

O. B. Eriçok, H. Ertürk

WEDNESDAY JUNE 8, 2016

DEDICATION LECTURE 2

Chair: J. R. Howell

9:00 – 10:00 RADIATIVE TRANSFER IN PLANETARY ATMOSPHERIC ENTRY FLOWS: CHALLENGES FOR FUTURE MISSIONS
A. Soufiani

SESSION 6 – GAS RADIATION

Chair: P. Coelho

10:00 - 10:30 THE MULTI-SPECTRAL ENERGY BUNDLE METHOD APPLIED TO LINE-BY-LINE MONTE CARLO COMPUTATIONS
A. Maurenente, Y. S. B. Freitas

10:30 - 11:00 Coffee Break

11:00 - 11:30 CALCULATIONS OF THERMAL RADIATION TRANSFER OF C₂H₂ AND C₂H₄ TOGETHER WITH H₂O, CO₂, AND CO IN A ONE-DIMENSIONAL ENCLOSURE USING LBL AND SNB MODELS
C. Qj, S. Zheng, H. Zhou

11:30 - 12:00 LINE-BY-LINE CALCULATIONS OF THE THERMAL RADIATION FIELD IN A TWO-DIMENSIONAL AXISYMMETRIC ENCLOSURE COMPOSED OF NON-GRAY SOOTING MEDIA FOR THE EVALUATION OF THE WSGG MODEL
F. R. Centeno, R. Brittes, F. H. R. França

12:00 - 12:30 THE RANK CORRELATED SLW MODEL OF GAS RADIATION IN NON-UNIFORM MEDIA
V. P. Solovjov, F. André, D. Lemonnier, B. W. Webb

LUNCH BREAK and FREE AFTERNOON

THURSDAY JUNE 9, 2016

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

Chair: F. H. R. França

9:00 - 9:30 DISCRETE ORDINATES SOLUTION OF RADIATIVE TRANSFER IN SCATTERING MEDIA WITH COLLIMATED IRRADIATION
P. J. Coelho

9:30 - 10:00 RAY TRACING ON GRAPHIC PROCESSORS: TOWARDS HIGH FIDELITY RADIATIVE TRANSFER SOLVERS
F. P. Siddiqui, A. M. Basol, M. P. Mengüç

10:00 - 10:30 TRANSIENT VECTOR RADIATIVE TRANSFER IN ONE-DIMENSIONAL SCATTERING MEDIA BY NATURAL ELEMENT METHOD
Y. Zhang, F. J. Yao, H. C. Zhang, H. L. Yi

10:30 - 11:00 Coffee Break

SESSION 8 – SOLUTION METHODS FOR RADIATIVE AND COUPLED TRANSFERS - II

Chair: S. P. Roy

11:00 - 11:30 NON-GRAY COMBINED CONDUCTION AND RADIATION HEAT TRANSFER BY USING FVM AND SLW
Y. Sun, X. Zhang, J. R. Howell

11:30-12:00 A CONSISTENT APPROACH FOR SIMULATING NATURAL CONVECTION WITH RADIATIVE HEAT TRANSFER IN PARTICIPATING MEDIA
M. Parmananda, A. Dalal, G. Natarajan

12:00 - 14:00 LUNCH BREAK

SESSION 9 – RADIATIVE TRANSFER IN INDUSTRIAL AND COMBUSTION SYSTEMS – II

Chair: F. Liu

14:00 - 14:30 SHIELDING OF FIRE RADIATION WITH THE USE OF MULTI-LAYERED WATER MIST CURTAINS: PRELIMINARY ESTIMATES
L. A. Dombrovsky, S. Dembele, J. X. Wen

14:30 - 15:00 RADIATION ATTENUATION AND OPACITY IN SMOKE AND WATER SPRAYS
G. Parent, P. Boulet, R. Morlon, E. Blanchard

15:00 - 15:30 AXISYMMETRIC AND 3-D NUMERICAL SIMULATIONS OF THERMOMECHANICAL BEHAVIOR DURING THE SPARK PLASMA SINTERING “SPS” PROCESS OF

POLYCRYSTALLINE MATERIALS: THE EFFECTS OF LATERAL SURFACES RADIATION
ON THE OVERALL HEAT TRANSFER
F. Mechighel, B. Pateyron, M. Kadja

15:30 - 16:00 Coffee Break

SESSION 10 – NANOSCALE RADIATIVE TRANSFER – III

Chair: G. Parent

16:00 - 16:30 A DESIGN TOOL FOR NEAR-FIELD RADIATIVE TRANSFER: THE DEVELOPMENTAL
STEPS OF THE NF-RT-FDTD CODE
A. Didari, M. P. Mengüç

16:30-17:00 VANADIUM DIOXIDE BASED FABRY-PEROT EMITTER FOR DYNAMIC RADIATIVE
COOLING APPLICATIONS
S. Taylor, Y. Yang, L. Wang

17:00 - 17:30 NEAR-FIELD RADIATIVE HEAT TRANSFER BETWEEN CLUSTERS OF DIELECTRIC
NANOPARTICLES
J. Dong, J. Zhao, L. H. Liu

20:00 - 23:00 GALA DINNER

FRIDAY JUNE 10, 2016

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

Chair: K. Daun

- 9:00 - 9:30 A GENERALIZED ANALYTICAL MODEL FOR RADIATIVE TRANSFER IN VACUUM THERMAL INSULATION OF SPACE VEHICLES
I. V. Krainova, L. A. Dombrovsky, A. V. Nenarokomov, S. A. Budnik, D. M. Titov, O. M. Alifanov
- 9:30 - 10:00 EFFECT OF RADIATION AROUND CORE/SHIELD CONTACT SPOTS IN VACUUM INSULATION PANELS
J. Lee, T. H. Song
- 10:00 - 10:30 DETERMINATION OF EXTINCTION COEFFICIENT AND SCATTERING ALBEDO OF WOVEN FABRICS
Udayraj, P. Talukdar, A. Das, R. Alagirusamy
- 10:30 - 11:00 Coffee Break

SESSION 12 – NON-HOMOGENEOUS STRUCTURES AND OPTICALLY COMPLEX MEDIA - II

Chair: T. H. Song

- 11:00 - 11:30 ABSORPTANCE BEHAVIOUR IN MACROPOROUS MEDIA UNDERGOING HETEROGENEOUS CHEMICAL REACTIONS
N. Banerji, P. Leyland, S. Haussener
- 11:30-12:00 ON THE TRUNCATION ISSUE IN THE CAVITY ATTENUATED PHASE SHIFT PM_{SSA} MONITOR
F. Liu, D. R. Snelling, K. A. Thomson, G. J. Smallwood
- 12:00 - 12:30 COMBINED HEAT TRANSFER IN A DIRECTLY IRRADIATED OPTICALLY-LARGE HETEROGENEOUS SPHERICAL PARTICLE
L. D. Yue, V. M. Wheeler, W. Lipiński
- 12:30 - 14:00 LUNCH BREAK

FORUM

Chairs: J. R. Howell, M. P. Mengüç, B. W. Webb, D. Lemonnier

- 14:00 - 15:00 The Istanbul Workshop: main conclusions

15:00 - 16:00 OPEN FORUM

16:00 END OF RAD-16 SYMPOSIUM

POSTER PRESENTATIONS

Monday, June 5 and Thursday, June 6
17:30 – 18:30

Posters will remain displayed all along the symposium to encourage discussions during breaks.

- P01 RADIATIVE ATTENUATION BY WATER SPRAYS FOR FIRE SAFETY
Z. Acem, G. Parent, A. Collin, P. Boulet, S. Ohurtsov, V. Benediuk
- P02 MODELING OF RADIATIVE HEAT TRANSFER IN A PYROLYSIS PILOT PLANT BIOMASS:
STUDY OF THE ANISOTROPIC SCATTERING COUPLING MIE THEORY WITH THE FINITE
VOLUME METHOD
T. Ali, M. A. Abbassi, A. Omri
- P03 SOLVER EVALUATION FOR COMPUTING THE RADIATIVE TRANSFER EQUATION USING
FINITE VOLUME METHOD AND BLOCK STRUCTURED MESHES
F. C. Miranda, J. Janicka
- P04 OPTOELECTRONIC PROPERTY MODELING OF CU NANOPARTICLES
A. Yuksel, M. Cullinan, J. Murthy
- P05 A HIERARCHICAL RADIOSITY METHOD APPLIED TO RADIATIVE HEAT TRANSFER
M. Le Bohec, D. Lemonnier, D. Saury, M. Bernard