

47th AIAA Plasmadynamics and Lasers Conference 2016

Held at the AIAA Aviation Forum 2016

Washington, D.C., USA
13 - 17 June 2016

ISBN: 978-1-5108-2735-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers.
Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at
00 sunrise alley suite 00, Reston, VA 20191, USA.

TABLE OF CONTENTS

PDL-01: COMPUTATIONAL METHODS

Divergence-Preserving Magnetohydrodynamic Solutions Using a Non-Iterative Hyperbolic Conservation Law Scheme (AIAA 2016-3226)	1
<i>Richard J. Thompson, Trevor M. Moeller</i>	
Numerical Simulation of Mars Entry Flight using Magnetohydrodynamic Parachute Effect (AIAA 2016-3227)	13
<i>Takayasu Fujino, Tomoyuki Takahashi</i>	
Numerical Simulation and Analysis of Hypersonic Vehicle Plasma Sheath (AIAA 2016-3229)	22
<i>Deyang Tian, Kun Qian, Chun Shao, W. Chen</i>	

PDL-02: PLASMA AND LASER DIAGNOSTICS

Assessment of Coherent Laser Diagnostic Techniques for Probing Atomic Oxygen in High-Enthalpy Flows (AIAA 2016-3379)	38
<i>Arne Meindl, Tobias A. Hermann, Stefan Loehle, Stefanos Fasoulas</i>	
Characterization of NO Production Over Metallic Surfaces in Air Plasmas Using Laser Induced Fluorescence (AIAA 2016-3380)	47
<i>Luke D. Allen, Jason M. Meyers, Douglas G. Fletcher</i>	
Laser Light Scattering from Equilibrium, High Temperature Gases: Limitations on Rayleigh Scattering Thermometry (AIAA 2016-3381)	61
<i>Christopher Limbach, Ciprian Dumitrasche, Azer P. Yalin</i>	
Toward a Microscopic Study of Laser Interactions with Levitated Liquid Fuel Droplets (AIAA 2016-3382)	74
<i>Christopher Limbach, Ryan Robinson, Dylan Adams, Megan Wilbanks, Azer P. Yalin</i>	

PDL-03: AERO-OPTICS

A Robust Modification of a Predictive Adaptive-Optic Control Method for Aero-Optics (AIAA 2016-3529)	86
<i>William R. Burns, Eric J. Juniper, Stanislav Gordeyev</i>	
Multiple Aperture Approach for the Study of Large-Scale Boundary-Layer Structures (AIAA 2016-3530)	106
<i>Matthew R. Kennett, William R. Burns, Stanislav Gordeyev</i>	
LES/RANS Modeling of Aero-Optical Effects in a Supersonic Cavity Flow (AIAA 2016-3531)	117
<i>Ilya A. Zilberter, Jack R. Edwards</i>	

PDL-05/FC-13: DBD ACTUATORS

Characterization of DBD Plasma Actuators Performance without External Flow - Part I: Thrust-Voltage Quadratic Relationship in Logarithmic Space for Sinusoidal Excitation (AIAA 2016-4013)	134
<i>David E. Ashpis, Matthew C. Lau</i>	
Basic Study on the Voltage Characteristic of Dual-Grounded Tri-Electrode Plasma Actuator by Plasma Simulation (AIAA 2016-4014)	153
<i>Asa Nakano, Hiroyuki Nishida</i>	
Simulation of Body Force Effect on Steady and Unsteady Flow Induced by DBD Plasma Actuator (AIAA 2016-4015)	161
<i>Bin Wu, Chao Gao, Feng Liu, Juntao Xiong</i>	
New Frequency Dependent Capacitance Based SDBD Plasma Model for Direct Simulation of 2D Navier-Stokes Equation (AIAA 2016-4016)	173
<i>Tapan K. Sengupta, Soumyo Sengupta, Pramod M. Bagade</i>	
Experimental Investigation of Dynamic Stall in a Wide Range of Mach Numbers by Plasma Actuators with Combined Energy/Momentum Action (AIAA 2016-4017)	196
<i>Andrey Starikovskiy, Richard Miles</i>	

Optimization of Dielectric Barrier Discharge Plasma Actuators for Conical-Forebody Flow Control (AIAA 2016-4018)	211
<i>Haiyang Hu, Huaxing Li, Xuanshi Meng, Xu Yan, Feng Liu, Shijun Luo</i>	
Experimental Study of Anti-icing and Deicing on a Cylinder by DBD Plasma Actuation (AIAA 2016-4019).....	220
<i>Xuanshi Meng, Jinsheng Cai, Yongqiang Tian, Xuzhao Han, Duo Zhang</i>	

PDL-06: PLASMA AND LASER TECHNOLOGIES

Plasma-Assisted Methane Combustion in Swirled-Flow Reactors: Experiments and Multiphysics Simulations (AIAA 2016-4139)	234
<i>Joseph W. Zimmerman, Rajavasanth Rajasegar, Constantinos M. Mitsingas, Andrew Palla, Darren King, David L. Carroll, Tonghun Lee</i>	
Internal Structure of LSD Wave Based on a 1-D Laser-induced Discharge Model: Comparison Between Numerical Simulation and Experiment (AIAA 2016-4140)	247
<i>Joseph A. Ofosu, Rei Kawashima, Kohei Matsui, Toru Shimano, Kimiya Komurasaki, Kohei Shimamura, Hiroyuki Koizumi</i>	
Numerical Analysis of Comb Shaped Plasma Front Propagation in Millimeter- Wave Discharge Under Atmospheric Pressure (AIAA 2016-4141)	255
<i>Yusuke Nakamura, Masafumi Fukunari, Toshikazu Yamaguchi, Kimiya Komurasaki, Hiroyuki Koizumi</i>	
Remote Lasing in Humid Air from Atomic Hydrogen (AIAA 2016-4142)	261
<i>Tat Loon Chng, Arthur Dogariu, Richard B. Miles</i>	
Measurement of Heat-Flux for Magneto-Aerodynamic Interaction Studies in a Hypersonic Flow (AIAA 2016-4143)	271
<i>K. K. N. Anbuselvan, K. Reddy</i>	
Kinetic Mechanism of Plasma Recombination in Methane, Ethane and Propane After High-Voltage Nanosecond Discharge (AIAA 2016-4144).....	282
<i>Andrey Starikovskiy, Eugeny M. Anokhin, Mikhail A. Popov, Nikolay L. Aleksandrov, Igor V. Kochetov</i>	

PDL-07: PLASMA AERODYNAMICS

Transient Plasma Impact on Spectra of Flow Disturbances in a Corner Separation Zone at Mach 4.5 (AIAA 2016-4304)	299
<i>Alec Houpt, Brock Hedlund, Stanislav Gordeyev, Thomas J. Juliano, Sergey B. Leonov</i>	
Numerical Rebuilding of Shock Layer Ionization for Two Flight Tests (AIAA 2016-4305).....	315
<i>Sergey Surzhikov</i>	
Controllable Shock Wave Generation by Near-Surface Electrical Discharge (AIAA 2016-4306)	332
<i>Sergey B. Leonov, Alec Houpt, Brock Hedlund, Timothy Ombrello</i>	
Suppression of Laser Breakdown by Pulsed Nonequilibrium NS Discharge (AIAA 2016-4307)	345
<i>Ilya Semenov, Andrey Starikovskiy, Mikhail N. Shneider</i>	
Trajectory Control of Small Rotating Projectiles by Laser Discharges (AIAA 2016-4308)	361
<i>Andrey Starikovskiy, Christopher Limbach, Richard Miles</i>	
Author Index	