



# 15<sup>th</sup> Dusty Plasma Workshop

May 29 – June 1, 2018

The Westin Baltimore Washington Airport – BWI  
Baltimore, Maryland, USA

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## Contents

<b>Oral Presentations</b> .....	7
Recent Results from Complex Plasma Laboratory PK-4 on the International Space Station .....	11
Experimental Studies of Phase Separation in Dusty Plasmas under Microgravity .....	12
Structures of Coulomb crystals in cylindrical discharge plasmas under gravity and microgravity.....	13
Complex Plasmas under Compression – Capabilities of the Next Generation Complex Plasma Space Experiment “Ekoplasma”.....	14
2D Complex Plasma Crystal Experiments in the Large Chamber.....	15
Field-Aligned Chains within the PK-4 Environment .....	16
Experimental FCC-BCC Transitions in Plasma Crystals visualized using Machine Learning .....	17
High precision operando size measurement of microparticles .....	18
Variation of ion wake field inside a glass box.....	19
Fluctuation Theorem Confirmed in a Dusty Plasma* .....	20
Ion Wake Influence on Dust Chain Formation.....	21
Anomalous diffusion in 1D dusty plasma structures: A fractional Laplacian model for strong correlations.....	22
Experimental observation of cnoidal wave structures of dust acoustic waves* .....	24
<b>Thursday, May 31, 2018</b> .....	25
Dust charging and heating models: high magnetic fields and strong electron emission .....	27
Emergent Bistability and Switching in a Nonequilibrium, Dusty Plasma Crystal .....	28
Nanodusty plasma - the real dusty plasma.....	29
Nonlinear responses of a strongly coupled dust particle pair under the influence of an ion wake.....	31
Measurements of Thermal Effects in the Dispersion Relation of the Dust Acoustic Wave.....	32
Non-linear effect of a vertical dust chain confined in a glass box.....	33
Interaction between a dust particle pair and the ion flow modified potential in complex plasma.....	34
Overlapped Plasma Sheath in Narrow Space .....	35
Status and future of the Magnetized Dusty Plasma Experiment (MDPX) .....	36
Quantitative analysis of laser forces in binary complex plasmas .....	37
Methods for the characterization of imposed, ordered structures in MDPX.....	38
<b>Friday, June 1, 2018</b> .....	39
Non-invasive impedance measurements of electron density in a complex plasma .....	41
Particle Orbits in Combined E and B Fields.....	42
Laser Induced Fluorescence (LIF) in the Caltech Water-Ice Dusty Plasma Experiment .....	43
Blast waves experiments in a 2D dusty plasma.....	44
Interaction of a supersonic particle with a three-dimensional complex plasma .....	45
Inductively Coupled Discharges to Sustain and Rotate Dusty Plasmas at High Magnetic Fields.....	46
Modeling the growth of chondrule dust rims under different plasma conditions in protoplanetary disks .....	47
<b>Poster Presentations</b> .....	48
<b>Poster Session 1</b> .....	50
<b>Wednesday, May 30, 2018</b> .....	50

An overview of modifying the spatial structure in a complex plasma .....	52
Exploration and Comparison of ISS PK4 Data to Ground- and Numerical-based Models.....	53
Interpretation of dust impact signals detected by RPWS and BMSW instruments.....	54
Emergent Bistable Switching in Nonequilibrium Crystal .....	55
In-situ nanoparticles characterization by Small Angles X ray Scattering (SAXS) during their growth in a dusty plasma	56
Study of particles de-agglomeration in non-equilibrium low-pressure radiofrequency plasma .....	57
Plasma-dust structures in the DC discharge .....	58
Experimental investigation of the properties of plasma-dust formations on pulsed plasma accelerator.....	59
Simulation of Dust Dynamics for Various Materials of the Edge Fusion Plasma.....	60
The Effect of External Magnetic Field on Dust Particles Charging Processes.....	61
Obtaining hydrophobic and hydrophilic surfaces in low-temperature atmospheric pressure plasma .....	62
Coulomb Crystal of Micro-organisms in an RF Plasma.....	63
Shear deformations in dusty plasma .....	64
Diffusive motion in a three-dimensional cluster in PK-4.....	65
Modeling-challenge paradigm using design of experiments method for spacecraft immersed in nonstationary, between-regimes, flowing plasma.....	66
Microfluidic flow in single-layer dusty plasmas .....	67
Filamentation and imposed ordered dust structure in magnetized discharge .....	68
Ionization waves in the PK-4 neon DC discharge .....	69
15 <sup>th</sup> Dusty Plasma Workshop .....	70
Trilayer dusty plasma lattice structure and dynamics 15 <sup>th</sup> Dusty Plasma Workshop.....	71
Investigation of Dusty Plasma Effects in Hypervelocity Impacts .....	72
<b>Poster Session 2</b> .....	73
<b>Thursday, May 31, 2018</b> .....	73
Molecular dynamic simulation of weakly magnetized dusty plasmas .....	78
Novel configuration for creation and study of probe-induced dust voids .....	79
DC response of dust equilibria to AC signals.....	80
Anomalous diffusion in 1D dusty plasma structures: A fractional Laplacian model for strong correlations.....	81
Nematic transition in microgravity complex plasma liquid crystals .....	82
Dust-Plasma Interactions in Extended Field Aligned Dust Chains .....	83
PLASMIANTE: A plasma filter for the detection of airborne asbestos.....	84
Effects of discrete stochastic charging on the non-spherical growth of water-ice grains in a dusty plasma.....	85
Dust Lattice Waves and dust influenced Ionization Waves in PK-4 complex plasmas .....	86
Ekoplasma – The Future of Complex Plasma Research in Space .....	87
Radial confinement of dense dust structure at cryogenic temperature .....	88
Investigation of carbon nanowalls synthesis by chemical vapor deposition method in the plasma of a radio-frequency capacitive discharge.....	89
High-speed imaging and analysis of a high-temperature microparticle interactions with a magnetron plasma.....	90
Synthesis of dust particles by combined discharge at atmospheric pressure. ....	91
Surface Temperature of the Dust Particle in Cryogenic Conditions .....	92

Thursday, May 31			Location:
7:00 AM	8:25 AM	<b>Breakfast</b>	<i>All meals and events will take place in the White Oak Room unless otherwise noted.</i>
7:30 AM	8:25 AM	<b>Registration</b>	
8:30 AM		<b>Welcoming Remarks</b>	
8:35 AM	8:55 AM	8:35 am. L. Vignitchouk. Dust Charging and Heating Models: High Magnetic Fields and Strong Electron Emission	
9:05 AM	9:25 AM	9:05 am J. Burton. Emergent Bistability and Switching in a Nonequilibrium, Dusty Plasma Crystal	
	9:30 AM		
9:30 AM	9:50 AM	9:30 am. F. Greiner. Nanodusty plasma - the real dusty plasma	
	9:55 AM		
9:55 AM	10:10 AM	9:55 am. O. H. Anaz. Two dimensional dust density wave diagnostics (DDW-D) for the full characterization of a nanodusty plasma	
10:15 AM	10:30 AM	<b>Coffee Break</b>	
10:35 AM	10:50 AM	10:35 am. Z. Ding. Nonlinear responses of a strongly coupled dust particle pair under the influence of an ion wake	
	11:00 AM		
11:00 AM	11:15 AM	11:00 am. J. Williams. Measurements of Thermal Effects in the Dispersion Relation of the Dust Acoustic Wave	
	11:20 AM		
11:25 AM	11:40 AM	11:25 am. J. Kong Non-linear effect of a vertical dust chain confined in a glass box	
	11:45 AM		
11:50 AM	12:05M	11:50 am. K. Qiao. Interaction between a dust particle pair and the ion flow modified potential in complex plasma	
	12:10 AM		
12:15 PM	12:30 PM	12:15 pm. M. Chen. Overlapped Plasma Sheath in Narrow Space	
12:35 PM	1:35 PM	<b>Lunch</b>	
1:40 PM	2:50 PM	<b>Poster Session 2:</b> D. Batryshev, M. Menati, B. Doyle, D. Funk, S. LeBlanc, M. McKinlay, E. Kostadinova, D. Sanford, C. Duée, S. Ashrafi, K. Qiao, C. Knapek, D. Polyakov, V. Shumova, Y. Yerlanuly, T. Schaub, M. Muratov	<b>Salon 3A</b>
2:55 PM	3:20 PM	2:55 pm. E. Thomas, Jr. Status and future of the Magnetized Dusty Plasma Experiment (MDPX)	
3:25 PM	3:40 PM	3:25 pm. F. Wieben. Quantitative analysis of laser forces in binary complex plasmas	
3:45 PM	4:05 PM	<b>Coffee Break</b>	
4:10 PM	4:25 PM	4:10 pm. T. Hall. Methods for the characterization of imposed, ordered structures in MDPX	
	4:30 PM		
4:35 PM	4:50 PM	4:35 pm. Vyacheslav Lukin. National Science Foundation	
	4:55 PM		
5:00 PM	5:15 PM	5:00 pm. Nirmol Podder. Department of Energy	
5:35 PM	5:50 PM	Board Bus/ Ride to UMBC	Please board one the 2 UMBC buses at the Hotel entry.
5:55 PM	7:15 PM	<b>Tour of UMBC Labs</b>	
7:20 PM	7:35 PM	Board Bus/ Return to Westin by BWI	Please board one the 2 UMBC buses at the Circle facing the Fine Arts Bldg.

# **Poster Session 2**

**Thursday, May 31, 2018**

## Synthesis of dust particles by combined discharge at atmospheric pressure.

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Synthesis of nano and micrometer size dust particles from the gas phase in low pressure non thermal plasma is well studied [1-2]. Also, atmospheric pressure plasma is widely used for deposition of thin films, for surface treatment and for the synthesis of nanoparticles [3-4].

In this work the results of experiments on the dust particle synthesis and its deposition on the surface of a silicon substrate by combining two types of discharge at atmospheric pressure is presented. The experimental setup consists of two pin type copper electrodes connected to the pulsed high voltage source (spark discharge) and two copper tapes wrapped around quartz tube powered by kHz high voltage sinusoidal signal (APP jet). In that case, the spark discharge served as a source of precursor and small-size nanoparticles which in the region of a uniform dielectric barrier discharge of the plasma jet, increased in size (due to coagulation or surface growth) and settled on the surface of the substrate. As a working gas pure Ar and He were used.

The characteristics of the plasma jet and the properties of the deposited nanoparticle contained thin films depend on the material, location and on the geometry of the electrodes of spark discharge and other experimental parameters. Therefore, several types of the location of the spark discharge electrodes have been studied and a dynamic I-V characteristic of a combined discharge was also obtained. The temperature of the substrate surface interacting with a plasma jet flow of combined discharge was investigated by a thermocouple and compared with results of just spark discharge temperature measurements. The particle size distributions were determined as a function of the synthesis time and the spark discharge power. Chemical composition of the deposited nanoparticles at different experimental conditions was also obtained by energy-dispersive spectroscopy (EDS).

[1] M. Mikikian , L. Cou`edel, M. Cavarroc , Y. Tessier, and L. Boufendi, Eur. Phys. J. Appl. Phys. 49, (2010) 13106

[2] T.S. Ramazanov, A.N. Jumabekov, S.A. Orazbayev, M.K. Dosbolayev, M.N. Jumagulov, Physics of Plasmas, 19 (2012) 023706

[3] D. Merche, N. Vandencastele, F. Reniers, Thin Solid Films 13 (2017) 4219-4236.

[4] I. Adamovich et.al. J. Phys. D: Appl. Phys. 50 (2017) 323001.