15th Dusty Plasma Workshop

May 29 – June 1, 2018
The Westin Baltimore Washington Airport – BWI
Baltimore, Maryland, USA

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MECHANICAL ENGINEERING

Contents

Thursday, May 31			Location:
7:00 AM	8:25 AM	**Breakfast**	***All meals and events will take place in the White Oak Room unless otherwise noted.***
7:30 AM	8:25 AM	**Registration**	
8:30 AM		**Welcoming Remarks**	
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	**Coffee Break**	
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	**Lunch**	
1:40 PM	2:50 PM	**Poster Session 2:** 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	**Salon 3A**
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	**Coffee Break**	
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	**Tour of UMBC Labs**	
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

Surface Temperature of the Dust Particle in Cryogenic Conditions

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In present work the surface temperature of the dust particle in cryogenic complex plasmas at low gas pressure is considered. It is shown that comparing with background gas, the dust particle surface temperature at low pressure is significantly higher. The gas temperature near the grain surface is a slowly decreasing function of distance with asymptotic ~ 1/r behavior. Effects related to the dust particle surface temperature are important for space around dust particle with double radius of average interparticle distance. At the distances comparable with average interparticle distance, these effects are not influencing on the gas temperature [1]. But as a whole can affect ion temperature and energy distribution function, dust particle charge screening, and the neutral shadowing force. The temperature ratio of the dust particle surface and the surrounding gas in the low-pressure weakly ionized complex plasmas is calculated using the formula derived in [2]. Orbit motion limited theory was used to calculate the electron and ions fluxes to the dust particle surface in a weakly collisional regime [3].

References:

1. T. Ramazanov, Zh. Moldabekov, and M. Muratov, Grain Surface Heating in Cryogenic Environment, Phys. Plasmas **24**, 050701 (2017)
2. S.A. Khrapak, G.E. Morfill, Grain surface temperature in noble gas discharges: Refined analytical model, Phys.Plasmas **13**, 104506 (2006)
3. S.A. Khrapak, S.V. Ratynskaia, A.V. Zobnin, A.D. Usachev, V.V. Yaroshenko, M.H. Thoma, M. Kretschmer, H. H□ofner, G.E. Mor_ll, O.F. Petrov, and V.E. Fortov, Particle charge in the bulk of gas discharges, Phys.Rev. E **72**, 016406 (2005).