

## **INT Program INT-15-3 Week 1**

### **Intersections of BSM Phenomenology and QCD for New Physics Searches**

September 14 - October 23, 2015

*ALL TALKS WILL BE HELD IN THE SEMINAR ROOM, C421, &  
ALL AFTERNOON DISCUSSIONS WILL BE HELD IN C-423*

#### **Monday, September 14, 2015**

10:00 AM Informal Discussion in C421

#### **Tuesday, September 15, 2015**

10:00 AM "Time-reversal violation in radiative beta decay of  $^{38}\text{K}$ : plans for atom trap experiment"  
John Behr, TRIUMF

3:00 PM Discussion Session

#### **Wednesday, September 16, 2015**

10:00 AM "Constraining modified gravity with the eq. of state in neutron stars"  
Felipe J. Llanes-Estrada, Universidad Complutense de Madrid

3:00 PM Discussion Session

#### **Thursday, September 17, 2015**

9:30 AM "Signatures of a nonstandard Higgs from flavor physics"  
Oscar Cata, LMU Munich

3:00 PM Discussion Session

#### **Friday, September 18, 2015**

10:00 AM "Dark matter direct searches and scalar strangeness of the nucleon"  
Li-Sheng Geng, Beihang University

3:00 PM Discussion Session

## INT Program INT-15-3 Week 2

### Intersections of BSM Phenomenology and QCD for New Physics Searches

September 14 - October 23, 2015

*ALL TALKS WILL BE HELD IN THE SEMINAR ROOM, C421 &  
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#### **Monday, September 21, 2015**

- 9:30 AM "BSM physics and nuclear beta decay"  
Barry Holstein, University of Massachusetts
- 11:00 AM "Nucleon EDM with lattice QCD"  
Andrea Shindler, Forschungszentrum Jülich
- 3:00 PM Discussion Session

#### **Tuesday, September 22, 2015**

- 9:30 AM "Quark and Glue Components of the Proton Spin"  
Keh-Fei Liu, University of Kentucky
- 11:00 AM "Nucleon EDM computation from lattice QCD"  
Eigo Shintani, Mainz University
- 3:00 PM Discussion Session

#### **Wednesday, September 23, 2015**

- 9:30 AM "Constraints on new physics: EDMs vs Higgs production."  
Emanuele Mereghetti, Los Alamos National Lab
- 11:00 AM "Unitarity and resonances in composite Higgs scenarios"  
Domenec Espriu, University of Barcelona
- 3:00 PM Discussion Session

## INT Program INT-15-3 Week 2

### Intersections of BSM Phenomenology and QCD for New Physics Searches

September 14 - October 23, 2015

#### Thursday, September 24, 2015

- 9:00 AM **Focus day: Neutron-antineutron oscillations**  
"New Developments in the Theory of  $n$ - $\bar{n}$  Oscillations"  
Susan Gardner, University of Kentucky
- 9:45 AM "Neutron-Antineutron Oscillation and CP Violation"  
Arkady Vainshtein, University of Minnesota
- 10:30 AM **Coffee Break**
- 11:00 AM "Search for neutron-antineutron transformation with neutron sources"  
Yuri Kamyshev, University of Tennessee
- 12:00 PM **Lunch Break**
- 2:00 PM "New perspectives on  $|\Delta B|=2$  dynamics"  
Bartosz Fornal, University of California, Irvine
- 2:45 PM "Neutron-Antineutron Perturbative Operator Renormalization"  
Michael Wagman, University of Washington

#### Friday, September 25, 2015

- 9:30 AM "Some nuclear physics aspects of the Sakharov conditions"  
Ubirajara van Kolck, Institut de Physique Nucleaire
- 11:00 AM "Symmetry violations in beta decay, searches for scalar and tensor interactions"  
Keri Vos, Van Swinderen Institute, University of Groningen
- 2:00 PM "Hamiltonian Diagonalizations & Variational Methods for Exotic and Conventional Hadrons"  
Steve Cotanch, North Carolina State University
- 3:00 PM Discussion Session

## INT Program INT-15-3 Workshop Week 3

### QCD for New Physics Searches at the Precision Frontier

September 28 - October 2, 2015

Session chairs

#### Monday, September 28, 2015

8:00 AM **Registration in PAT C411**

***TALKS WILL BE HELD IN PAA A114***

8:50 AM	Welcome from David Kaplan, INT Director	
9:00 AM	"Beyond the Standard Model at Low and High Energies" Michael Ramsey-Musolf, U. Massachusetts Amherst	<b>Barry Holstein</b>
9:45 AM	"Lattice QCD and Flavor Physics in the Precision Era" Aida El-Khadra, University of Illinois	
10:30 AM	<b>Coffee Break</b>	
11:00 AM	"Review on lattice nucleon charges" Martha Constantinou, University of Cyprus	
11:45 AM	"EDM and MDM Overview" Arkady Vainshtein, University of Minnesota	
12:30 PM	<b>Lunch Break</b>	
2:30 PM	"Test Fundamental Symmetries via $\pi^0$ , $\eta$ and $\eta'$ decays" Liping Gan, University of North Carolina Wilmington	<b>Ruth van de Water</b>
3:15 PM	"Rare kaon decays from the lattice" Xu Feng, Columbia University	
3:45 PM	<b>Coffee Break</b>	
4:15 PM	"Aspects of LQCD decays with multi-hadron final states" Stephen Sharpe, University of Washington	
5:00 PM	Discussion	

## INT Program INT-15-3 Workshop Week 3

### QCD for New Physics Searches at the Precision Frontier

September 28 - October 2, 2015

Session chairs

Tuesday, September 29, 2015

<b>TALKS WILL BE HELD IN PAA A114</b>		
9:00 AM	"Overview of new physics with muons ( $g-2$ , $\mu-e$ , ...)" William Marciano, Brookhaven National Laboratory	<b>David Hertzog</b>
9:45 AM	"muon $g-2$ experiment" Brendan Kiburg, Fermi National Accelerator Laboratory	
10:30 AM	<b>Coffee Break</b>	
11:00 AM	" $g-2$ on the lattice and HVP" Christine Davies, University of Glasgow	
11:45 AM	" $g-2$ on the lattice, HLbL" Tom Blum, University of Connecticut	
12:15 PM	"Hadronic light-by-light for muon $g-2$ " Martin Hoferichter, INT	
12:45 PM	<b>Lunch Break</b>	<b>Richard Hill</b>
2:30 PM	"Overview of neutrino physics (for nuclear and hadron theorists)" Maria Concepcion Gonzalez-Garcia, Stony Brook/ U Barcelona	
3:15 PM	"Overview of neutrino experiments" Minerba Betancourt, Fermilab	
4:00 PM	<b>Coffee Break</b>	
4:30 PM	"Lattice Axial Form Factors for Upcoming Neutrino Experiments" Aaron Meyer, University of Chicago/Fermilab	
5:00 PM	Discussion	

## INT Program INT-15-3 Workshop Week 3

### QCD for New Physics Searches at the Precision Frontier

September 28 - October 2, 2015

Session chairs

Wednesday, September 30, 2015

<b>TALKS WILL BE HELD IN PAT C520</b>		
9:00 AM	"Chiral Perturbation Theory for Precision Physics and BSM" Johan Bijnens, Lund University	<b>Jerry Miller</b>
9:45 AM	"The proton radius puzzle" Carl Carlson, College of William and Mary	
10:30 AM	<b>Coffee Break</b>	
11:00 AM	"Lepton flavor violation in tau hadronic decays" Emilie Passemar, Indiana University	
11:30 AM	"BSM searches in hadron weak decays" Jorge Martin Camalich, Johannes Gutenberg Univ	
12:00 PM	<b>Lunch Break</b>	
2:00 PM	"Fund. symmetries in lattice low-energy nuclear physics" Andre Walker-Loud, Lawrence Berkeley National Laboratory	<b>Keh Fei Liu</b>
2:45 PM	"Baryon Number Violation Overview" Kaladi Babu, Oklahoma State University	
3:15 PM	<b>Coffee Break</b>	
3:45 PM	"Proton Decay and other BSM in the lattice" Eigo Shintani, Mainz University	
4:15 PM	"Progress on n-nbar in the lattice" Michael Buchoff, Lawrence Livermore National Lab	
5:00 PM	Discussion	

## INT Program INT-15-3 Workshop Week 3

### QCD for New Physics Searches at the Precision Frontier

September 28 - October 2, 2015

Session chairs

Thursday, October 1, 2015

<b>TALKS WILL BE HELD IN PAT C520</b>		
9:00 AM	"EFTs for new physics" Vincenzo Cirigliano, Los Alamos National Laboratory	<b>Tom Blum</b>
9:45 AM	"Flavor physics at SuperKEKB and J-PARC" Shoji Hashimoto, KEK	
10:30 AM	<b>Coffee Break</b>	
11:00 AM	"EDM experiments" Florian Piegsa, ETH Zurich	
11:45 AM	"EDMs and (chiral) effective field theory" Jordy de Vries, Forschungszentrum Jülich	
12:15 PM	<b>Lunch Break</b>	
2:15 PM	"EDMs on the lattice" Gerrit Schierholz, DESY	<b>Shoji Hashimoto</b>
3:00 PM	"EDMs on the lattice with higher-dim. operator" Tanmoy Bhattacharya, Los Alamos National Laboratory	
3:30 PM	<b>Coffee Break</b>	
4:00 PM	Discussion	
6:30 PM	<b>Workshop Dinner</b>	

## INT Program INT-15-3 Workshop Week 3

### QCD for New Physics Searches at the Precision Frontier

September 28 - October 2, 2015

Session chairs

Friday, October 2, 2015

<b>TALKS WILL BE HELD IN PAT C520</b>		
9:00 AM	"QCD and Dark Matter searches" Richard Hill, University of Chicago	<b>Alejandro Garcia</b>
9:45 AM	"lattice QCD and composite dark-matter" George Fleming, Yale University	
10:15 AM	"Nuclei on the lattice for BSM Searches" William Detmold, MIT	
10:45 AM	<b>Coffee Break</b>	
11:15 AM	"Overview of BSM in beta decay (and hadron matrix elements)" Martin Gonzalez-Alonso, IPN Lyon	
11:45 AM	"n decay correlations" Brad Plaster, University of Kentucky	
12:15 PM	"Overview of n-lifetime experiments" Chen-Yu Liu, Indiana University	
12:45 PM	<b>Lunch Break</b>	<b>Johann Bijnens</b>
2:30 PM	"The Qweak experiment" Paul King, Ohio University	
3:15 PM	"BSM physics; light and weakly coupled" Maxim Pospelov, University of Victoria	
4:00 PM	Adjourn	



## INT Program INT-15-3 Week 4

### Intersections of BSM Phenomenology and QCD for New Physics Searches

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#### Monday, October 5, 2015

- 9:30 AM "Beyond-Standard-Model Tensor Interaction and Hadron Phenomenology"  
Simonetta Liuti, University of Virginia
- 11:00 AM "Lattice QCD calculation of nucleon charges  $g_A$ ,  $g_S$ ,  $g_T$  for nEDM and beta decay"  
Boram Yoon, Los Alamos National Laboratory
- 3:00 PM Discussion Session

#### Tuesday, October 6, 2015

- 10:00 AM "Nuclear parity violation from lattice QCD"  
Thorsten Kurth, LBL
- 3:00 PM Discussion Session

#### Wednesday, October 7, 2015

- 10:00 AM "BSM CP violation in kaons: B-parameters, precision tests of  $\epsilon_k$ "  
Weonjong Lee, Seoul National University
- 3:00 PM Discussion Session: whiteboard talk by Christopher Lee, Los Alamos National Laboratory, "CP-violating flavor oscillations in electroweak baryogenesis."

#### Thursday, October 8, 2015

- 10:00 AM "Precision calculations with nonrelativistic EFTs: proton radius from muonic hydrogen"  
Antonio Pineda, Universitat Autònoma de Barcelona
- 3:00 PM Discussion Session

#### Friday, October 9, 2015

- 10:00 AM "QCD and lattice-QCD techniques for dark matter searches"  
Enrico Rinaldi, LLNL
- 3:00 PM Discussion Session

## INT Program INT-15-3 Week 5

### Intersections of BSM Phenomenology and QCD for New Physics Searches

September 14 - October 23, 2015

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#### Monday, October 12, 2015

- 9:30 AM "The proton radius puzzle"  
Gerald Miller, University of Washington
- 11:00 AM "Weak excitation of baryon resonances and neutrino experiments"  
Luis Alvarez-Ruso, Univ. Valencia
- 3:00 PM Discussion Session

#### Tuesday, October 13, 2015

- 9:30 AM "Lattice QCD for axion cosmology"  
Evan Berkowitz, LLNL
- 11:00 AM "New Theoretical Constraints on Dark Matter from the Formation of Bound States"  
Devin Walker, University of Washington
- 3:00 PM Discussion Session

#### Wednesday, October 14, 2015

- 9:30 AM "Neutrinos and physics beyond the Standard Model"  
Mihai Horoi, Central Michigan University
- 11:00 AM Blackboard talk: "SCET<sub>++</sub>: A new soft-collinear mode for small-R jets"  
Christopher Lee, Los Alamos National Laboratory
- 3:00 PM Discussion Session

#### Thursday, October 15, 2015

- 9:30 AM "Lepton universality violation and lepton flavor conservation in B-meson decays"  
Benjamin Grinstein, UCSD
- 11:00 AM "Breakdown of factorization theorems"  
Stan Brodsky, Stanford University
- 3:00 PM Discussion Session

#### Friday, October 16, 2015

- 9:30 AM "Strange form factors on the lattice"  
Jeremy Green, University of Mainz
- 11:00 AM "Proton spin decomposition"  
Yi-Bo Yang, University of Kentucky
- 3:00 PM Discussion Session

## INT Program INT-15-3 Week 6

### Intersections of BSM Phenomenology and QCD for New Physics Searches

September 14 - October 23, 2015

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#### Monday, October 19, 2015

- 9:30 AM "Parton distributions for BSM searches"  
Emanuele Roberto Nocera, Oxford University
- 11:00 AM "CTEQ activities on pdfs and impacts on BSM physics"  
Carl Schmidt, Michigan State University
- 3:00 PM Discussion Session

#### Tuesday, October 20, 2015

- 9:30 AM "Novel effects in QCD intrinsic heavy quark"  
Stan Brodsky, Stanford University
- 11:00 AM "nCTEQ PDFs and heavy quarks"  
Fred Olness, Southern Methodist Univ
- 3:00 PM Discussion Session

#### Wednesday, October 21, 2015

- 9:30 AM "Intrinsic heavy quarks in the proton and the highest energy neutrino events at Ice Cube" [Remote Presentation]  
Glennys Farrar, New York University
- 11:00 AM "Constraining unpolarized quark and gluon distribution functions at high-x at RHIC"  
Bernd Surrow, Temple University
- 3:00 PM "Bjorken-x Dependence of PDFs from Lattice QCD"  
Huey-Wen Lin, UC Berkeley

#### Thursday, October 22, 2015

- 9:30 AM "PDFs from Large Momentum Effective Theory"  
Yong Zhao, University of Maryland
- 11:00 AM "Interplay of target mass and threshold corrections in large-x pdf determination"  
Alberto Accardi, Jefferson Laboratory
- 3:00 PM Discussion Session

#### Friday, October 23, 2015

- 11:00 AM Discussion Session & Program Closure