QCD Evolution Workshop 2014

May 12 – 16, 2014

The Inn and Spa at Loretto

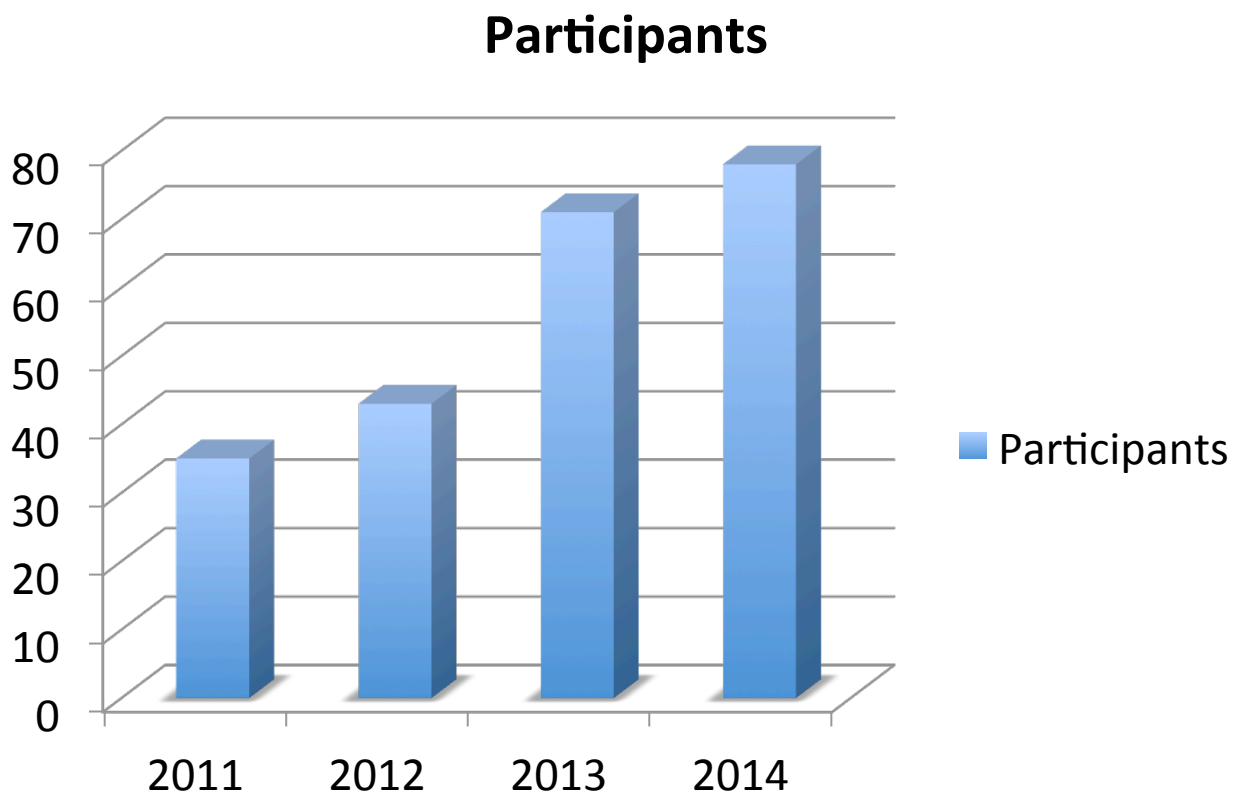
Santa Fe, NM

Organized jointly by

Los Alamos National Laboratory and Jefferson Lab

We are evolving

- This is our fourth workshop
- The number of participants grow (from 35 in 2011 to 80 in 2014)



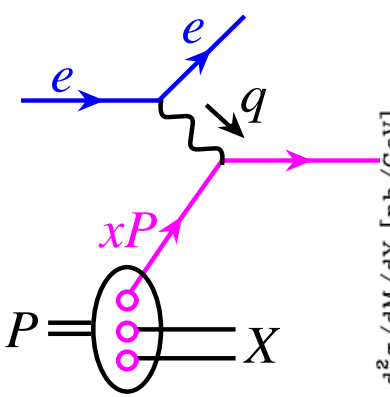
Meaning I: QCD Evolution Equations

- QCD Evolution Equations are important part and play critical roles in our understanding of QCD
- RG Equation of coupling constant: asymptotic freedom
- DGLAP, BFKL, BK, Collins-Soper evolution, TMD Evolution, RG equations, …
- Factorization, Evolution, Resummation

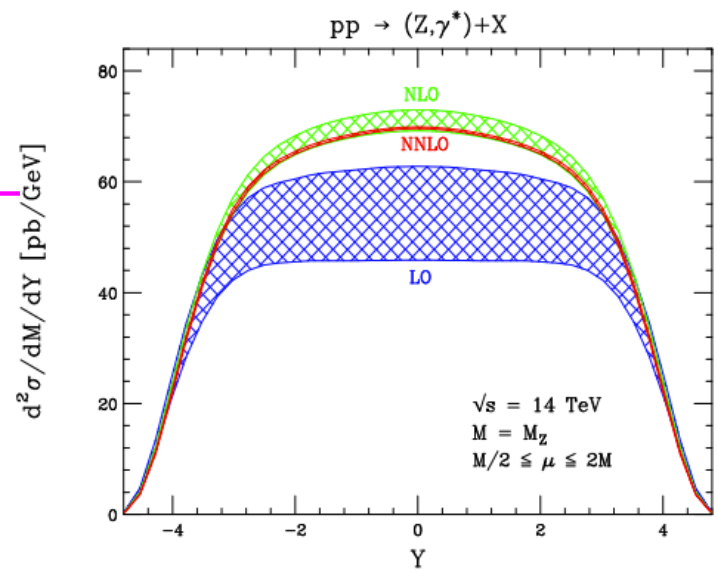
Meaning II: Evolution of QCD itself

Simple parton model with bare-hand LO calculation

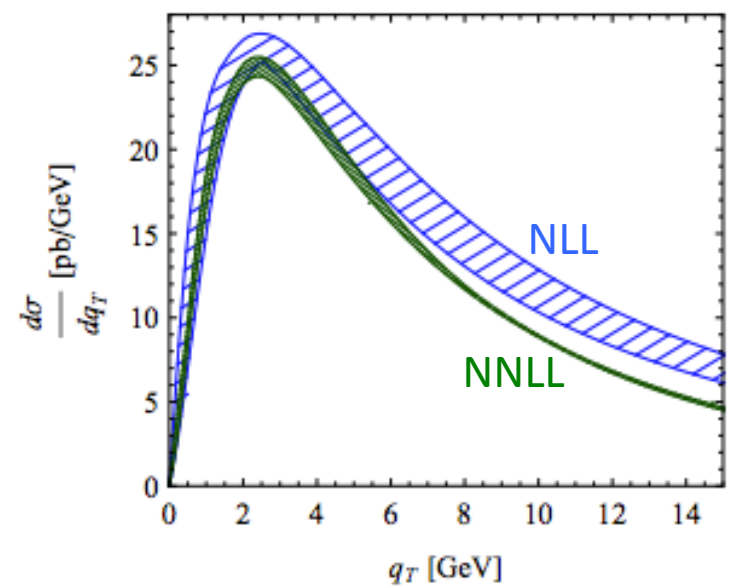
Much more advanced techniques (both analytic and numerical): NLO, NNLO, NLL, NNLL resummation, more differential



Anastasiou, et.al., 04



Becher, et.al., 11



QCD has evolved into quite some different sub-fields

The idea of the workshop

- Bring experts on different/diverse QCD sub-fields together, simulate discussions, and learn from each other, hopefully lead to new ideas and new collaborations cross sub-fields
- By working together, hope to make progress/breakthrough on QCD

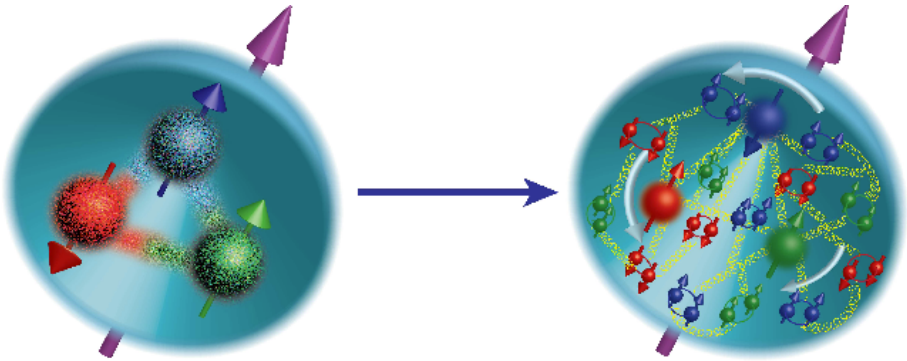
The physics motivation

Explore the QCD structure of nucleon and nuclei

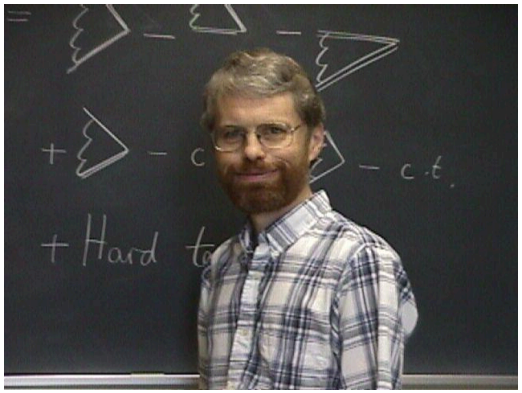
- Where does the spin of the nucleon come from?
- How are the quarks and gluons distributed in space and momentum inside the nucleon
- What happens when we go to small-x? Does the gluon density saturate?
- How does the quark and gluon distribution in a large nucleus compare to that in the nucleon
- ……

Understand the associated QCD dynamics

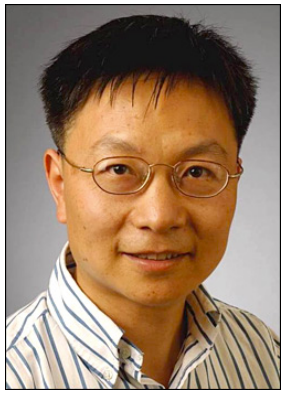
- What are the QCD factorization formalism for the interested hard processes?
- Are the associated PDFs universal?
- How do the PDFs evolve (factorization scale/rapidity/energy, etc)?
- How to ambiguously probe all these distributions in experiments?
- How to construct nucleon 3D tomography?
- ……



Overview talks

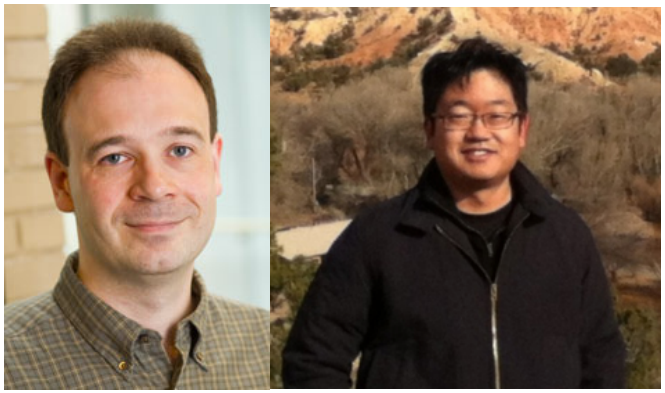


TMDs

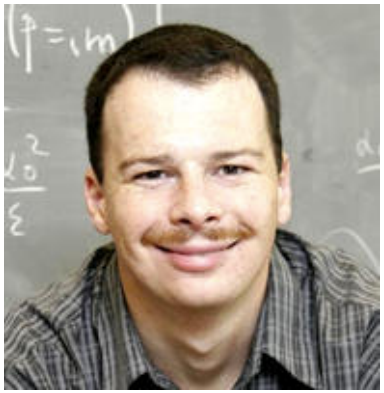


EIC

JLab 12



SCET



Small x

GPDs

pQCD

RHIC spin

Many other interesting talks and new developments

Monday, May 12, 2014		
8:30-9:00	Registration & Continental Breakfast	
9:00-9:15	Welcome	Ivan Vitev
9:15-9:30	Introduction	Zhongbo Kang
	Chair: Zhongbo Kang	
9:30-10:05	Overview of TMD factorization and evolution	John Collins
10:05-10:35	Electron-Ion Collider - taking us to the next QCD frontier	Jianwei Qiu
10:35-10:55	Coffee Break	
10:55-11:25	JLab 12 GeV program	Robert McKeown
11:25-11:50	TMDs of definite rank	Piet Mulders
11:50-12:15	Phenomenological implementations of TMD evolution	Mariaelena Boglione
12:15-14:00	Lunch Break	
	Chair: Alexei Prokudin	
14:00-14:25	A unified treatment of the QCD evolution of TMDPDFs and TMDFFs	Ahmad Idilbi
14:25-14:50	QCD Evolution of the Sivers Asymmetry	Miguel Echevarria
14:50-15:15	QCD evolution effect for Collins function	Peng Sun
15:15-15:40	Phenomenology of TMDs using SCET	Stefano Melis
15:40-16:00	Coffee Break	

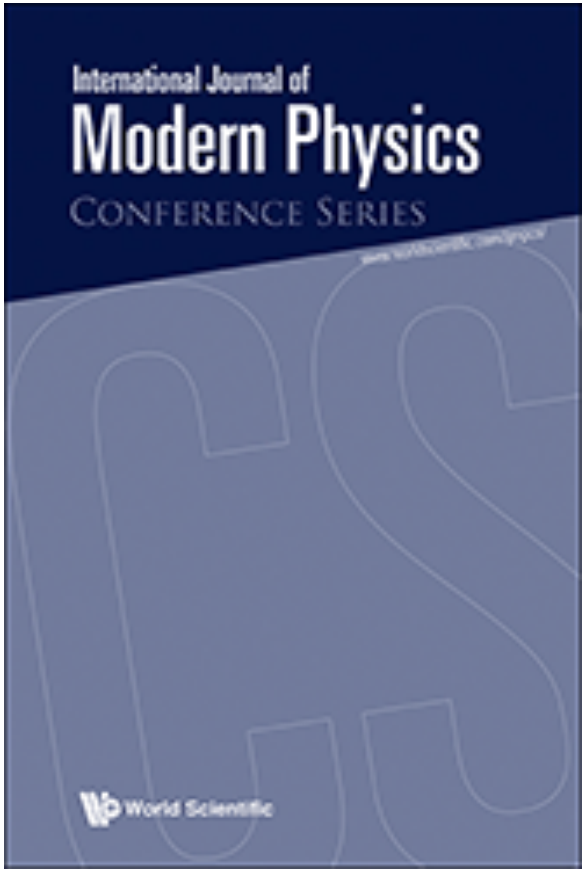
Change due to Snow Storm in Denver

Monday Morning: 11:50 – 12:15
Mariaelena Boglione→Markus Diehl

Monday Afternoon: 15:15 – 15:40
Stefano Melis→Igor Cherednikov

Talks: allocated time includes 5 minutes for questions and discussions

Proceedings



We will send you information soon after the workshop

Hope to have a productive and enjoyable workshop