

Closing Remarks @ Spin 2018



Haiyan Gao

Duke University and Duke Kunshan University



Not a summary of Spin2018 program

- Thanks to all conveners for excellent highlight talks
- Thanks to all plenary talk speakers for their excellent talks
- A few remarks
 - Personal reflection
 - Spin Physics Symposium: global nature, impact and diversity in topics
 - Unveiling Spin 2020



The Wonder of Spin Dynamics in Quantum Chromodynamics

Jianwei Qiu
Theory Center, Jefferson Lab



Fifty Years of Polarized Targets

A personal Memoir
D. G. Crabb
University of Virginia

Electric Dipole Moment Searches using Storage Rings

Frank Rothmann
(JEDI collaboration)
Forschungszentrum Jülich
10.09.2018



Electric Dipole Moment Searches using Storage Rings (Frank Rothmann/JEDI collaboration)

Nuclear Spin Physics via Polarization Measurements

Tomotsugu Wakasa
Department of Physics, Kyushu University



Status and Perspectives of the NICA Project

A.D.Kovalenko, V.D.Kekeidze, R.Lednicky, V.A.Matveev,
I.N.Meshkov, A.S.Sorin, G.V.Trubnikov, R.Tsenov
Joint Institute for Nuclear Research, Dubna



Final Results of the Qweak Experiment

A search for new PV physics at the TeV scale by measuring the proton's weak charge (Q_p)



DNP Lab

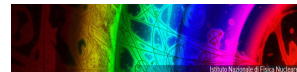
Hyperpolarizing ^{13}C spins by DNP for MRI applications

Arnaud Comman



Nucleon Femtography from Exclusive Reactions

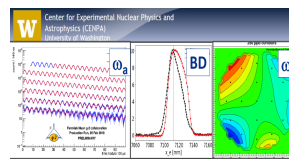
Simionetta Liuti
(University of Virginia)



Internal gas target experiments at the LHC

V.Corasaniti, G.Ciullo, P.Di Nezza, P.Lenzi, L.Pappalardo, E.Steffens

¹University of Ferrara and INFN, ²INFN Laboratori Nazionali di Frascati, ³University of Bologna



Overview and status of the muon g-2 experiment at Fermilab

David Hertzog, on behalf of the E989 Collaboration
University of Washington
January 12, 2018

SPIN2018 23rd International Spin Symposium

Self Polarization in Storage Rings

Contents

- Theoretical discovery of radiative polarization.
- Very first evidence of beam polarization (at low energy).
- Later measurements at higher energy.
- HERA collider.
- Summary

Eliana GIANFELICE (Fermilab)
SPIN 2018, FERRARA



30 years of **hermes**

exploiting self-polarization in storage rings at HERA



Günar.Schnell @ desy.de

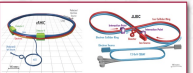


Status and Perspectives of a US-based Electron-Ion Collider (EIC)

Bernad Surrow

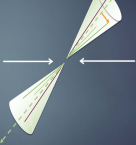
TEMPLE

University of Kentucky



Spin Phenomena in Jets

Renee Fatemi
University of Kentucky



Spin Physics with Photon Beams

Paolo Pedroni
INFN-Sezione di Pavia, Italy
For the A2@MAMI collaboration (Mainz-Germany)



Lattice QCD calculations of the quark and gluon contributions to the proton spin

Rajan Gupta
(Los Alamos National Lab)

Quantum technologies: manipulating individual spins
Tommaso Calarco
(University of Cologne and Jülich Research Centre)

University of Ferrara, one of the oldest in Italy (est. 1391)



Duke Kunshan University, a global new university in China among youngest in the world (est. 2014)



Three Italian students are among the inaugural class

Spin 2018 plenary sessions held in the theater “Teatro Nuovo”



DKU inaugural CLASS 2022 Opening Convocation 2018, August 14, 2018



Haiyan Gao

Another common feature is water



**Spin Physics Symposium has been
global**

**Spin symposium series has been taking place in 9 countries so far;
the two newest countries added: Italy (2004), China (2014)**



**More Global and new countries are invited to
join the spin physics symposium family**

**Spin Physics Symposium has been
impactful**

ISPC at Spin 2014, Beijing, China





Electron Ion Collider: The Next QCD Frontier

Understanding the glue
that binds us all

EIC: next frontier for
strong interaction

Nucleon Structure:

- spin of nucleon
- mass of nucleon
- role of gluons
- confinement
- exotic states
- ...

CERN: LHeC
USA: eRHIC, JLEIC

China: EicC

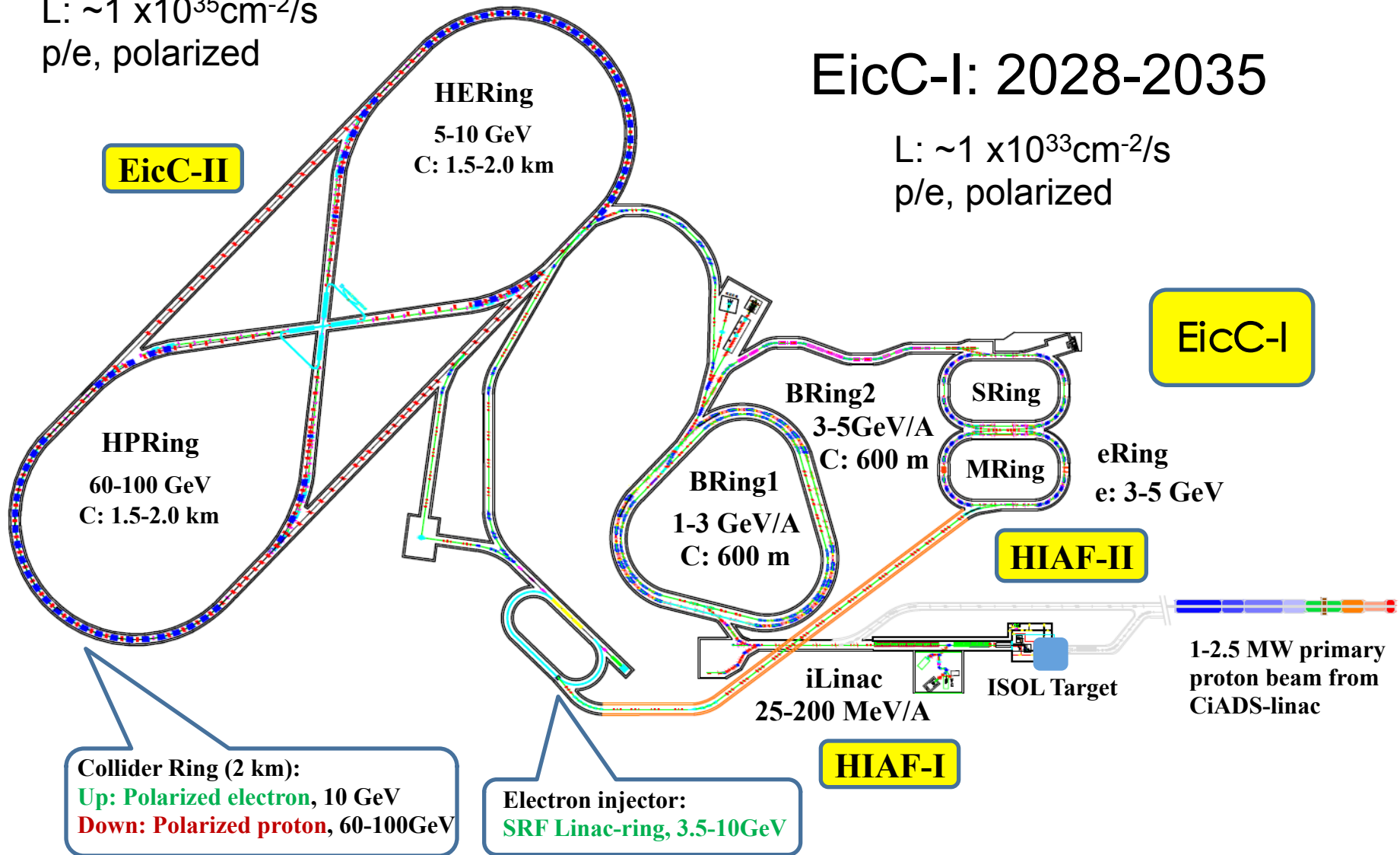
Bernd Surrow's talk

EicC Conceptual Design

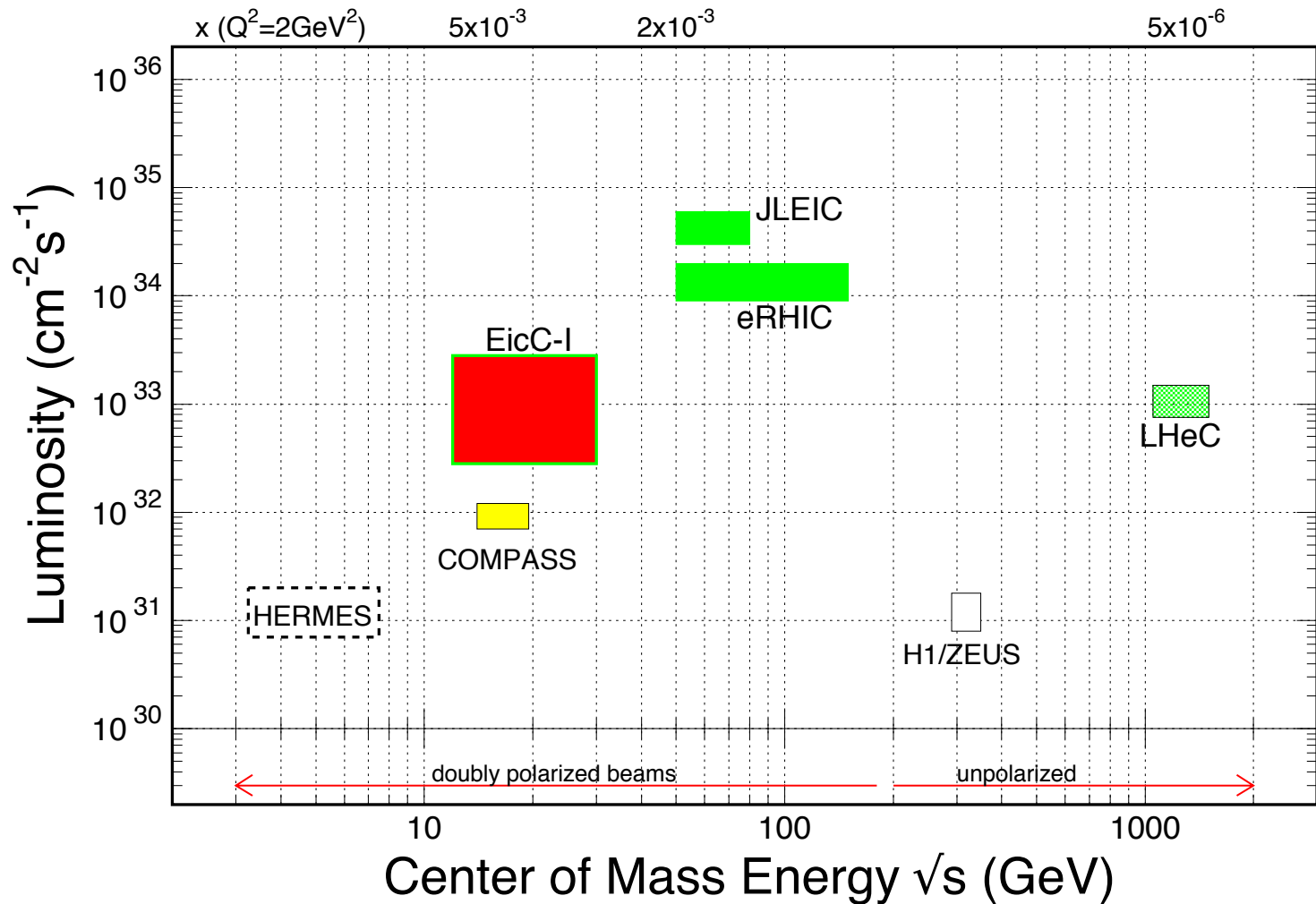
L: $\sim 1 \times 10^{35} \text{cm}^{-2}/\text{s}$
p/e, polarized

EicC-I: 2028-2035

L: $\sim 1 \times 10^{33} \text{cm}^{-2}/\text{s}$
p/e, polarized



Designed Energy and Luminosity



EicC-I: will be constructed at $\sqrt{s} \sim 15\text{GeV}$ region

- 1) Focus on nuclear physics problems
- 2) B-quark hadron production

**Spin Physics Symposium has been
diverse in spin related topics**

Spin Milestones and Proton Spin Puzzle

- Spin Milestones: (Nature)

- 1896: Zeeman effect (milestone 1)
- 1922: Stern-Gerlach experiment (2)
- 1925: Spinning electron (Uhlenbeck/Goudsmit)(3)
- 1928: Dirac equation (4)
- Quantum magnetism (5)
- 1932: Isospin(6)
- 1935: Proton anomalous magnetic moment
- 1940: Spin–statistics connection(7)
- 1946: Nuclear magnetic resonance (NMR)(8)
- 1971: Supersymmetry(13)
- 1973: Magnetic resonance imaging(15)
- 1980s: “Proton spin crisis” (now puzzle)
- 1990: Functional MRI (19)
- 1997: Semiconductor spintronics (23)
- 2000s: “New breakthrough in spin physics”?



**Pauli and Bohr watch
a spinning top**

**Proton spin taken for
granted for coming from
the spin of the quarks!!**

topological insulator, quantum anomalous Hall effect, etc..

Nature: <http://www.nature.com/milestones/milespin/index.html>

More diverse spin related topics at recent spin symposia

- Spin 2018: Spin and Cosmology; Quantum Technologies: manipulating individual spins; Hyperpolarizing ^{13}C spins by DNP for MRI applications; Applications to other fields
- Spin 2014: Medical Imaging with Highly Spin Polarized Molecules; public lecture on Quantum Anomalous Hall Effect and Information Technology; parallel sessions on spins in condensed matter, quantum information and computation
- Spins are important in all areas of physics - more diverse spin related topics and applications for spin symposium are desirable

Unveiling the 24th Spin Physics Symposium – Spin 2020

ISPC at Spin 2018, Ferrara, Italy



Thank you for your participation of SPIN2018 at Ferrara
Welcome all to SPIN2020 hosted by RIKEN in Matsue

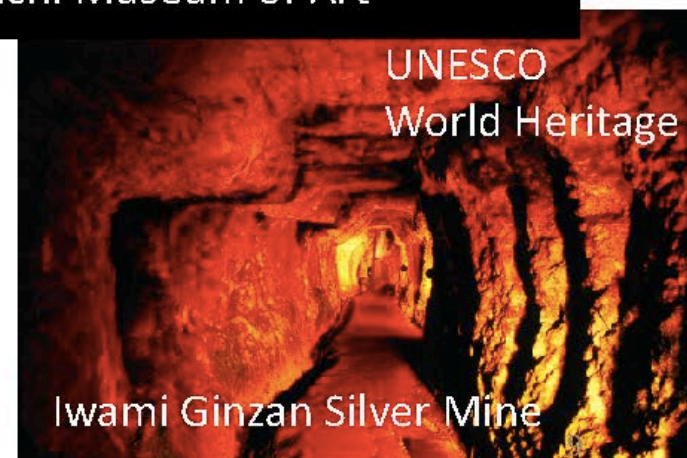


Where is Matsue

- Famous and interesting area for 2,000 years of Japanese history from creation myth era to present day
- Two domestic airports near Matsue city, Izumo airport and Yonago airport
- About 30 to 45 minutes from both airports to Matsue city by airport shuttle bus
- Connected with Haneda international airport in Tokyo by more than 10 daily flights



Sightseeing spots



2017 International Workshop on Polarized Sources, Targets, and Polarimetry

Oct 16 - 20, 2017

KAIST Munji Campus, Daejeon, Republic of Korea



❖ TOPICS:

- **Polarized Solid Target**
- **Polarized Gas Target**
- **Polarized Electron Sources**
- **Polarized Ion Sources**
- **Proton Polarimetry**
- **Electron Polarimetry**
- **Application of Spin**
- **New Initiatives**

Local Organization Committee

Seongtae Park *CAPP/IBS*

Jihoon Choi *CAPP/IBS*

Myeongjae Lee *CAPP/IBS*

Selcuk Haciomeroglu *CAPP/IBS*

Soohyung Lee *CAPP/IBS*

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D G Crabb *Virginia* A V Efremov *JINR* G Fidecaro *CERN* W Haeberli *Wisconsin*

A D Krisch *Michigan* A Masaike *Kyoto* C Y Prescott *SLAC* T Roser *BNL*

V Soergel *Heidelberg* W T H van Oers *Manitoba*

The Workshop on Polarized Sources, Targets and Polarimetry has been a tradition for more than 20 years, moving between Europe, USA and Asia. The 17th International Workshop on Polarized Sources, Targets and Polarimetry (PSTP 2017) will take place at the Korea Advanced Institute of Science and Technology (KAIST), South Korea. The workshop addresses the physics and technological challenges related to polarized gas/solid targets, polarized electron/positron/ion/neutron sources, polarimetry and their applications.



Official Website: <http://pstp2017.ibs.re.kr>

Official Email: pstp2017@ibs.re.kr

KAIST

ORNL Proposal for PSTP 2019, approved by ISPC

Knoxville TN

- Located in Eastern Tennessee, near the Smoky Mountains
- Home to the University of Tennessee
- Serviced by Tyson McGee Airport (TYS)
 - All major American carriers
 - 20 minutes from downtown Knoxville, 25 minutes from ORNL
- Many options for accommodations and venues
 - Many meeting spaces of different sizes available
 - University of Tennessee meeting spaces are a possibility
 - On site at ORNL is also an option, although Knoxville would be preferred



XVII Workshop on High Energy Spin Physics

DSPIN-17

Dubna, Russia, September 10 - 15, 2017

Starts 1981

by L.I. Lapidus

Possibility to participate of physicists from the former USSR was important motivation. Distant trips are complicated by financial (earlier also by political and bureaucratic) reason.

110 participants

50 invited talks (40-30')

40 original talks (20').

3 parallel sections.



JINR - 64, Russia - 22 ,
Czech Republic - 4 ,
Germany – 3, USA - 3 ,
Belarus - 3, Poland - 2,
Italy - 4, Slovakia - 4,
Armenia, Bulgaria,
Estonia, Netherlands and
UK - 1



International Workshop on Spin Physics at NICA (SPIN-Praha-2018)



9-13 July 2018
Charles University, Prague
Europe/Prague timezone

Overview

General Information

Program Advisory
Committee

Organizing Committee

List of registrants

Scientific Programme

Timetable

Accommodation

Transportation

Registration Form

Fee

Visa Application

Contacts

OVERVIEW



This International Workshop on Spin Physics Experiments at NICA (SPIN-Praha-2018) is the next in the series of meetings on problems of symmetries and polarization phenomena in Particle and Nuclear Physics and Astrophysics related to the particles' spin. They have begun with the first meeting of this series at the Joint Institute for Nuclear Research, Dubna, in 1975, and continued on a regular basis from 1976 on in Czech Republic. Links to the Web sites of the previous meetings can be found at <http://spd.jlnr.ru/doku.php?id=conferences>.

Prague spin physics meetings aim at:

Thank you all and see you at Spin 2020 in Matsue, Japan



Special thanks to Paolo Lenisa, LOC, Program committee, conveners, all speakers, poster presenters, SPIN2018 participants, and ISPC members