Report on the 2017 National Nuclear Physics Summer School
July 9-22, 2017 – University of Colorado, Boulder, CO

Prepared by Edward Kinney on December 28, 2017, on behalf of the NNPSS 2017 Organizers:

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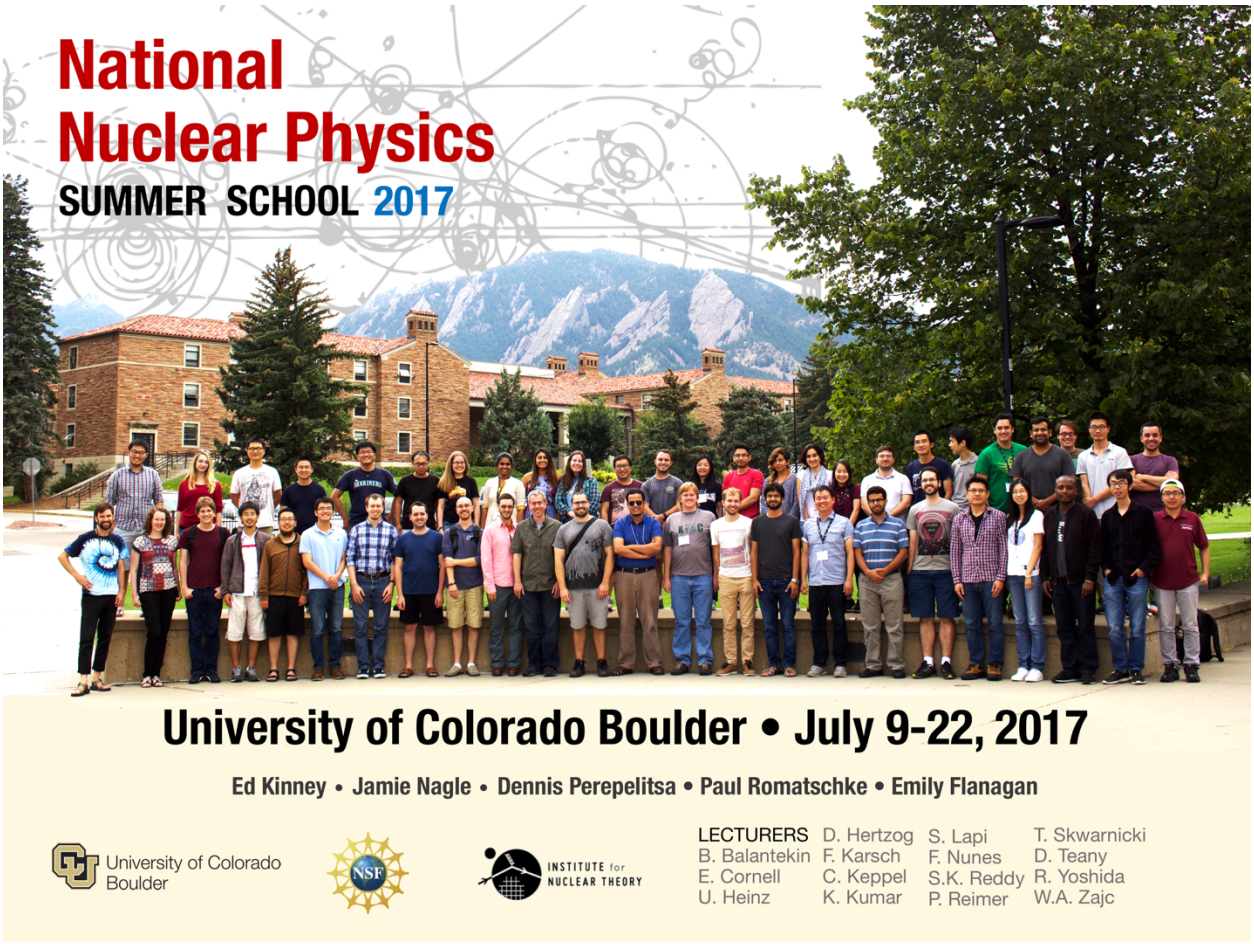

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1 NNPSS 2017 Overview

The 2017 National Nuclear Physics Summer School was held at the University of Colorado in Boulder from July 9-22. Some measures of the success of the school are:

- Of 50 students admitted, 47 attended including 12 women physicists
- Participation of 14 outstanding lecturers, covering major topics in nuclear structure and reactions, hadronic structure, fundamental symmetries, neutrino and heavy ion physics as well as more specialized talks on future programs at Jefferson Lab and the EIC, nuclear astrophysics, lattice QCD, meson spectroscopy and connections of QCD to string theory. Additional features were lectures on measurements of neutrinoless double beta decay, and applications in nuclear medicine.
- A special lecture on atomic parity violation was given by Nobel prize winner Eric Cornell.
- In addition to the opening reception on Monday evening (July 10), students enjoyed communal lunches and lengthy coffee breaks with available speakers and over 50% enjoyed an evening of Shakespeare at the Colorado Shakespeare festival as well as caught a major league baseball game in Denver.
- Using the smartphone application What'sApp, the students quickly formed a communication group among themselves and organized a number of evening and weekend activities on their own.
- We had an outstanding group of students! All the speakers commented on their attention, engagement, and excellent questions. Although wifi was available in the lecture room, few students had their laptops open during the lectures.

2 Comments for Future Organizers

Our primary advice to future organizers is to invite your speakers as soon as possible, since already in the early months of the calendar year, people are making their summer commitments. The organizing committee not only sought speakers who were expert, but also those with a reputation for excellent lecturing to graduate students as evidenced, for example, by previous summer school style lectures.

The logistical planning was relatively easy for us given that the university conference services organizes and runs many summer conferences around campus and our staff person Emily Flanagan has extensive experience with the annual TASI (particle physics) summer school held at the Physics department. Initial reservations and budgeting was set up already at the end of the 2016 summer when we were notified that our 2017 school proposal was accepted. Because the school was being organized by a university department, no advance deposits were required.

3 Scientific Program

Time	Monday 7/10	Tuesday 7/11	Wednesday 7/12	Thursday 7/13	Friday 7/14
9-10:30	EIC Program *R. Yoshida*	EIC Program	EIC Program	Nuclear Astrophysics *S.K. Reddy*	Nuclear Astrophysics
11-12:30	FRIB Program *F. Nunes*	FRIB Program	Fundamental Symmetries	Neutrino Physics *B. Balantekin*	Neutrino Physics
Lunch					
2-3:30	Lattice QCD *F. Karsch*	Lattice QCD	Lattice QCD	Hadron Spectroscopy *T. Skwarnicki*	Hadron Spectroscopy
4-5:30	FRIB Program	Fundamental Symmetries *D. Hertzog*	Fundamental Symmetries	Neutrinoless Double Beta Decay *K. Kumar*	Neutrinoless Double Beta Decay

Time	Monday 7/17	Tuesday 7/18	Wednesday 7/19	Thursday 7/20	Friday 7/21
9-10:30	Jefferson Lab Program *C. Keppel*	Jefferson Lab Program	Jefferson Lab Program	String Theory & QCD *D. Teaney*	String Theory & QCD
11-12:30	Rel. Heavy Ion Theory *U. Heinz*	Rel. Heavy Ion Theory	Rel. Heavy Ion Experiment *W. Zajc*	Rel. Heavy Ion Experiment	Rel. Heavy Ion Experiment
Lunch					
2-3:30	Hadronic Parton Structure *P. Reimer*	Hadronic Parton Structure	Hadronic Parton Structure	Nuclear Medicine *S. Lapi*	Nuclear Medicine
4-5:30	Seminar	Atomic EDM Studies at Colorado *E. Cornell*	OPEN	Career Discussion Panel	Closing Discussion

Lecturer	**Institution**	**Topic**
Baha Balantekin	University of Wisconsin	Neutrino Physics
Bill Zajc	Columbia University	Rel. Heavy Ion Experiment
Cynthia Keppel	Jefferson Laboratory	Jefferson Lab Program
David Hertzog	University of Washington	Fundamental Symmetries
Derek Teaney	SUNY - Stonybrook	String Theory & QCD
Filomena Nunes	Michigan State University	FRIB Program
Fritjof Karsch	Brookhaven National Laboratory	Lattice QCD
Krishna Kumar	SUNY - Stonybrook	Neutrinoless Double Beta Decay
Paul Reimer	Argonne National Laboratory	Hadron Partonic Structure

Rikutaro Yoshida	Jefferson Laboratory	EIC Program
Sanjay K. Reddy	University of Washington	Nuclear Astrophysics
Suzanne Lapi	University of Alabama - Birmingham	Nuclear Medicine
Tomasz Skwarnicki	Syracuse University	Hadron Spectroscopy
Ulrich Heinz	Ohio State University	Rel. Heavy Ion Theory

4 Extracurricular Activities

In addition to a number of activities organized by the student participants, a group hike was led by Jamie Nagle up one of the nearby peaks, many students went to Denver's Coors Field to see the Colorado Rockies defeat the San Diego Padres, and many also went to see the Colorado Shakespeare Festival's production of *The Taming of the Shrew.*

5 List of Student Participants

Last Name	First Name	Institution	Email
Ali	Salina	Catholic U	95ali@cua.edu
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7 Student Feedback and Photographs

During the final session of the summer school the students were given forms to capture anonymous feedback about the school. All responses are available upon request. The form is appended to this report. From the individual responses one can report that:

- All felt that they had a better understanding of the US nuclear physics program
- Many preferred blackboard presentation and if slides were used, many requested that the slides not be too dense.
- Roughly 50% would have liked a student poster session, however the other 50% actively did NOT want to present(!).
- The majority felt that the career planning discussion was useful, but could be improved, especially with more representation of careers outside the academy.
- Several people mentioned they would have liked more on detector technology, but the majority did not name another topic.

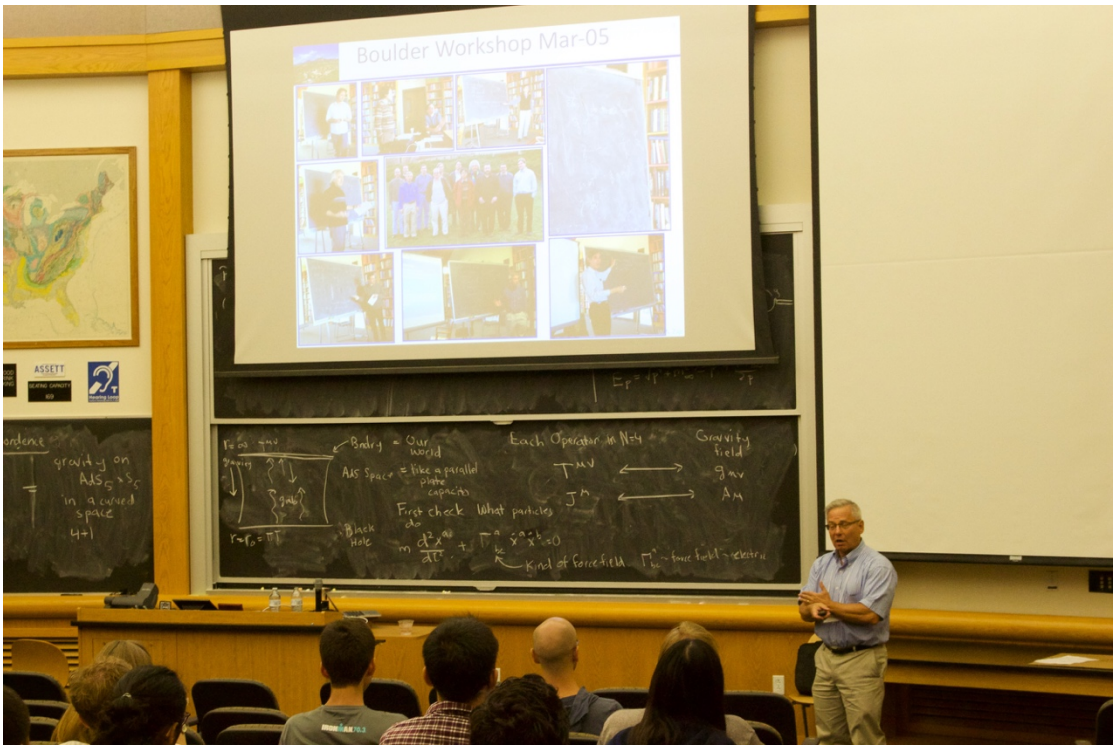
- Roughly 50% really enjoyed the short homework questions introduced by some of the speakers; most others were neutral about them (though they like having access to them after the lecture).
- Many highlights were listed, including particular speakers and topics. The overwhelming highlight mentioned was the interaction with their peers over the course of the 2 weeks, both socially and intellectually.

Dave Hertzog speaking on Fundamental Symmetries.

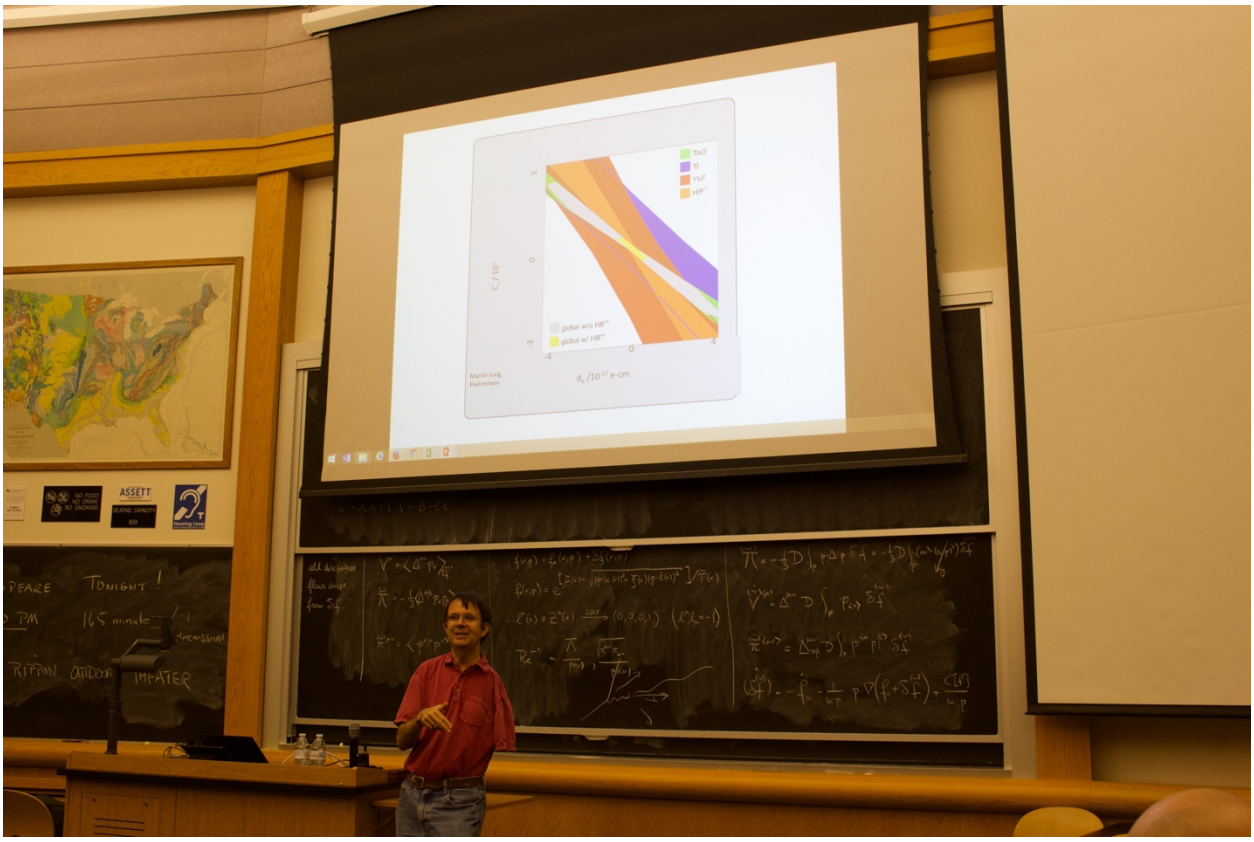
Baha Balantekin speaking on Neutrino Physics

Thia Keppel speaking on the Jefferson Lab Physics Program

Uli Heinz speaking on Heavy Ion theory.



Bill Zajc speaking on Heavy Ion experiment.



Eric Cornell speaking on Atomic Parity Violation.

Feedback Form

NNPSS 2017 Student Feedback

We would greatly appreciate feedback from your experience at this summer school! Please feel free to continue comments on the back side of the page.

1) Overall, do you feel you have a better understanding now of the major nuclear physics programs in the US?

2) You experienced many different styles of presentation; which do you feel was best suited to your learning?

3) Would you have liked to have had a student presentation/poster session?

4) Do you feel that the career planning discussion was useful? Interesting?

5) Were their topics/programs that were missing from the schedule that you would have liked to hear about? E.g., detector physics/technology.

6) Would you have liked all the speakers to give exercises/homework?

7) What was/were the highlight(s) of the summer school for you?

8) Is there any other feedback/advice you can give us in order to improve the summer school?