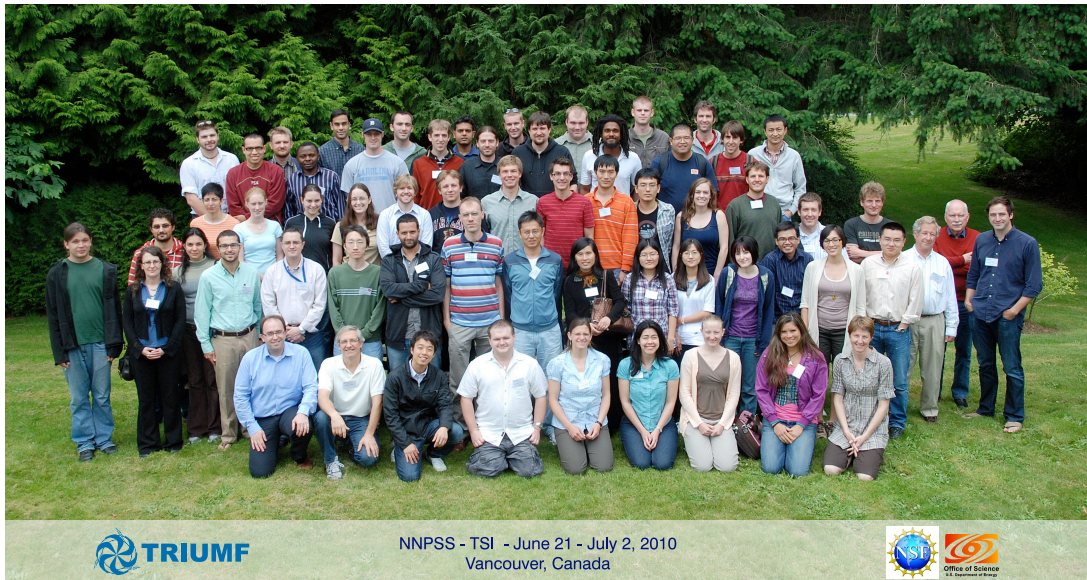


Final Report

2010 National Nuclear Physics Summer School held jointly with the TRIUMF Summer Institute

June 21 – July 2, 2010, Vancouver, BC, Canada



The 2010 National Nuclear Physics Summer School (NNPSS) (<http://nnpss-tsi.triumf.ca>) was held from June 21 - July 2, 2010 in Vancouver, BC, Canada, jointly with the TRIUMF Summer Institute (TSI), which is TRIUMF's annual two-week summer school. The NNPSS-TSI took place as a unique student activity prior to the International Nuclear Physics Conference (INPC), which brought together the worldwide nuclear physics community in Vancouver. The school provided a great opportunity for students to learn about the broad and exciting field of nuclear physics, before experiencing the newest results and discussions at the INPC. For all NNPSS-TSI participants, the INPC registration fee was waived, and the PhD students were automatically accepted to the INPC student program. We had a record response to the school and selected 58 participants from over 200 applicants!

Following the tradition of past NNPSS's, the school provided lectures and activities that covered the entire field of contemporary nuclear physics; ranging from hot and dense QCD; to hadron structure; to the physics of nuclei and nuclear astrophysics; to neutrinos and fundamental symmetries. Particular attention was paid to fostering interactions between students and lecturers as well as among the students, who came from all areas of nuclear science. By all accounts the NNPSS-TSI was a great success and the results from our exit survey were overwhelmingly positive, with overall school organization: 4.40 and overall experience: 4.68 (averages on a scale from 1 to 5).

1) Lecturers and topics

We were able to attract outstanding lecturers to the NNPSS-TSI, with a balance of theory and experiment, women and men speakers, across the exciting areas of our field. All lecture notes are available online at: http://nnpss-tsi.triumf.ca/lecture_notes.html

Nuclear astrophysics

Lecturer: Lars Bildsten (KITP/UCSB)

The nuclear physics and astrophysics of exploding stars

Seminar speaker: Jeff Blackmon (LSU)

Astrophysical reactions in the laboratory

Hot and dense QCD

Lecturer: Helen Caines (Yale)

Quarks and gluons under extreme conditions

Seminar speaker: Dam Son (INT/UW)

Strongly-coupled theories and universal aspects

Nuclear structure

Lecturer: Achim Richter (ECT*/TU Darmstadt)

The physics of nuclei

Seminar speakers:

Sonia Bacca (TRIUMF), Halo nuclei: theory and experiment

Geoff Grinyer (NSCL/MSU), High-precision nuclear structure experiment

Hadron structure

Lecturer: Xiangdong Ji (Maryland)

Hadron structure: lattice QCD and effective field theory

Seminar speaker: Haiyan Gao (Duke)

Frontiers in hadron structure

Neutrinos

Lecturer: Petr Vogel (Caltech)

Neutrinos and nuclei

Seminar speaker: Mark Chen (Queen's)

Underground neutrino physics

Fundamental symmetries

Lecturer: Krishna Kumar (UMass Amherst)

Low-energy tests of the electroweak theory and its symmetries with leptons, nucleons and nuclei

Seminar speaker: Vincenzo Cirigliano (LANL)

Effective field theories beyond the standard model

2) Participants

The school was attended by 58 participants, students and postdocs within ~2 years of their PhD (51 non-local participants, of which 50 were supported from the NSF contribution, + 7 local UBC/SFU/TRIUMF participants).

28 % of the participants were female participants (plus 3 female lecturers of 13 total, but we had initially invited more female lecturers who were not able to come).

35 of the participants were from the US, 12 from Canada, and 11 overseas (3 Germany, 2 Spain, 1 Australia, 1 China, 1 Finland, 1 Japan, 1 Poland, 1 UK).

The complete list of participants is:

Armstrong, Whitney Richard (Temple University)
Attanayake, Harsha (Ohio University)
Avila, Melina (Florida State University)
Berkowitz, Evan (University of Maryland)
Bolton, Daniel (University of Washington)
Brunner, Thomas (TRIUMF/TU Munich, Canada/Germany)
Carroll, Jonathan (University of Adelaide, Australia)
Cheng, Michael (Lawrence Livermore National Laboratory)
Cher, Yuri (McGill University, Canada)
Chester, Aaron (Simon Fraser University, Canada)
Chu, Pinghan (UIUC)
Cockrell, Robert (Iowa State University)
Divaratne, Dilupama (Ohio University)
Eibach, Martin (Institute for Nuclear Chemistry, Germany)
Fickinger, Michael (University of Arizona)
Finlay, Paul (University of Guelph, Canada)
Galinski, Naomi (TRIUMF/Simon Fraser University, Canada)
Guo, Peng (Indiana University)
Han, Ke (Berkeley National Laboratory)
Heilmann, Anna Maria Sonja (TU Darmstadt, Germany)
Ipson, Katharine Louise (University of Manchester, UK)
Kim, Young Jin (Indiana University)
Knecht, Andreas (University of Washington)
Kshetri, Ritesh (TRIUMF/Simon Fraser University, Canada)

Kwiatkowski, Anna (NSCL/MSU)
Lake, Peter (University of California, Berkeley)
Leach, Kyle George (University of Guelph, Canada)
Li, Gang (McGill University, Canada)
MacMullin, Sean (University of North Carolina)
Malkus, Annelise (University of Wisconsin)
Mane, Ernesto (TRIUMF, Canada)
McFarlane, Michael (University of Wisconsin)
Mei, Jiawei (Indiana University)
Meierhofer, Georg (University Tuebingen, Germany)
Mercado, Luis (UMass)
Ndikum, Luwani Zurmbonwi (Mississippi State University)
Nishimura, Hiromichi (Washington University, St. Louis)
Niu, Yifei (Peking University, China)
Palladino, Anthony (University of Virginia)
Parno, Diana (Carnegie Mellon University)
Patel, Hiren (University of Wisconsin)
Perez-Obiol, Axel (Universitat de Barcelona, Spain)
Raimondi, Francesco (University of Jyvaeskylae, Finland)
Rojas, Alexander (Florida State University)
Romero-Redondo, Carolina (IEM, CSIC, Spain)
Sallaska, Anne (University of Washington)
Sato, Koichi (Kyoto University, Japan)
Sen, Abhisek (Georgia State University)
Setoodehnia, Kiana (McMaster University, Canada)
Shen, Gang (Indiana University)
Simon, Vanessa Veronique (TRIUMF/University of Heidelberg, Canada/Germany)
Smith, Christel (Arizona State University)
Sternberg, Matthew Grant (University of Chicago/ANL)
Voss, Annika (TRIUMF/University of Manchester, Canada/UK)
Wendt, Kyle (The Ohio State University)
Zalewski, Maciej (University of Warsaw, Poland)
Zimmerman, William (University of Connecticut)

3) Format of the school

The format of the school was 3 lectures per day (all lecturers were 45min + 30min for discussions, questions, small-group discussions/short problem solving), with 2 lectures in the morning and 1 in the afternoon. One of the NNPSS-TSI days had 4 lectures. In addition, there were two discussion sessions in the afternoon after the lectures. The first one was 30min before the coffee break. This time was used for small groups to discuss problems/questions that came up during the lectures, with the task to come up with 1-2 questions per lecture plus any other points/questions that were not clear. The participants often continued to discuss into the coffee break. The second discussion session after the coffee break was then used to answer and explain these points/questions by the lecturers.

This discussion and lecturer question session format worked extremely well and we often had to break the discussions before heading off to dinner.

On Friday afternoon of the first week, we had a poster session to which almost all participants contributed. The posters were kept up throughout the following week to continue discussions.

4) Social events

We wanted to stimulate lots of discussions and foster interactions that continued in a more social setting, by organizing social events and evening activities. These included:

- Reception at Green College, UBC
- Visit to Museum of Anthropology, UBC
- TRIUMF Tour
- Picnic and Beach Volleyball at Spanish Banks Beach
- Kayaking at Deep Cove
- Banquet at the Vancouver Aquarium
- Canada Day Fireworks

The 2010 NNPSS-TSI was a great experience and we are grateful to Dana Giasson and Sandi Miller (TRIUMF) for all their help with the NNPSS-TSI organization and to Linda Vilett for her assistance with the budget and with planning questions.

Achim Schwenk and Alejandro Garcia
(Organizers of the 2010 NNPSS-TSI)