Theory Support

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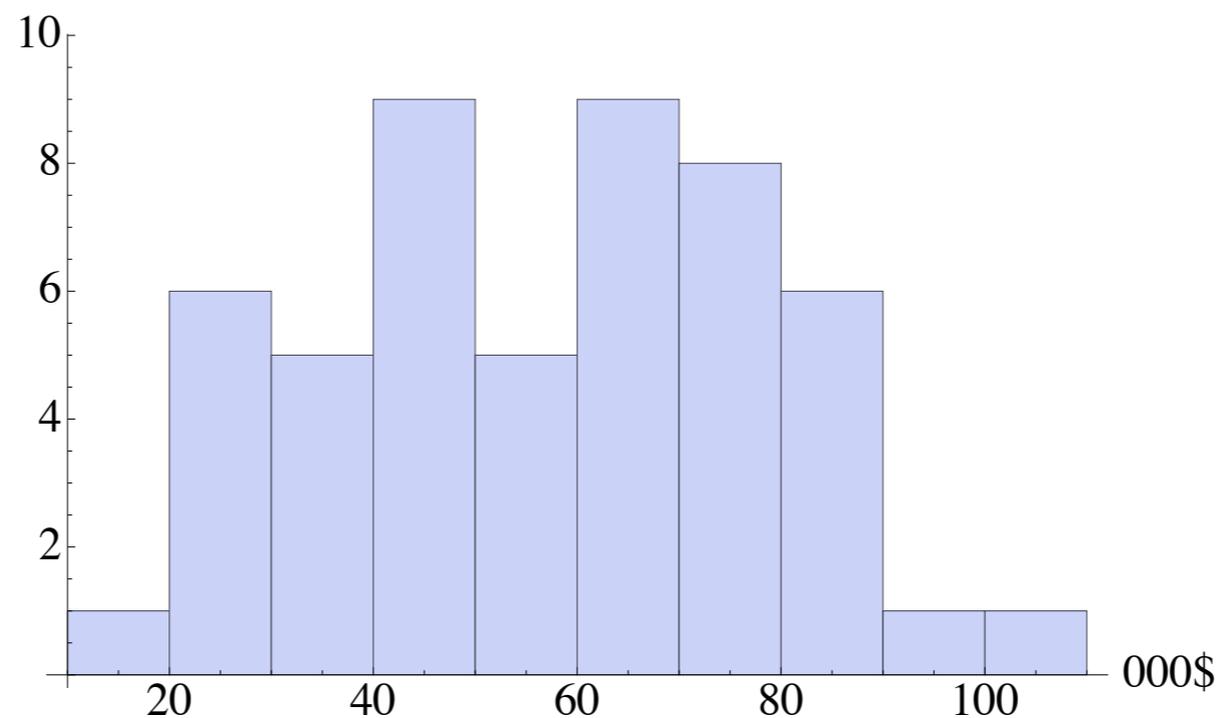
Member of the IPP council

Canadian particle physics theory community

- 51 particle theorists funded from the subatomic physics enveloppe in 2015

  - 39 at 18 universities across the country (group sizes range from 1 to 7)

  - 7 at the Perimeter Institute

  - 4 with joint appointment between Perimeter and a university (McMaster, Western Ontario, Victoria)

  - 1 at TRIUMF

Canadian particle physics theory community

Average Grant: 55k

typical budget:
- 2 students: 30k
- 1/2 postdoc: 25 k
- travel: 3k

Physics

- Unification of gravity and quantum field theory

- Theory of electroweak symmetry breaking

- Flavour physics

- Dark matter

- Baryogenesis

- Black hole

- Dark energy

- Strongly coupled dynamics

- QCD

- Standard Model computations

- Cosmology

Physics

Theorists address all the 'big questions' using different approaches:

- Study frameworks that incorporate gravity with the rest of the Standard Model.

- Propose extensions of the Standard Model that are accessible to the LHC and precision measurements.

- Propose models of dark matter and hidden sectors and propose ways to look for them.

- Propose and study new models of baryogenesis.

- Study models of flavour in the neutrino and quark sectors.

IPP support for theory

Theorists are an integral part of the particle physics community.

Strong ties between theory and experiment:

- Theorists propose new models to look for.

- Theorists interpret data and use it to build new models.

- Theorists propose new experiments.

- Theorists compute SM predictions to compare with data.

IPP support for theory

- The vast majority of Canadian particle theorists are members of IPP.

- There is typically a theorist sitting on the IPP scientific council.

- Theorists have served as IPP treasurer (including the current one)

- As a collective organization of nearly all particle physicists, the IPP is in a unique position to enhance both the theoretical and experimental particle physics program.

Theory PDF Program

- Active from 2003 to 2013

- 14 excellent postdocs hired. Many went on to faculty positions.

- Cost of the program: ~80 k/year

- Ramped down in 2013 in line with comments from SAPES when it reduced IPP MRS grant.

Theory PDF Program

Year	Name	Sponsor	Subsequent Position
2006	Frey Reuter	McGill Carleton	Winnipeg(Faculty) Freiburg (Faculty)
2008	Larjo Underwood	UBC McGill	Brown (RA) Pacific Lutheran (Faculty)
2009	Levi Wang	UBC McGill	private sector (data mining) Kavli-IPMU (RA)
2010	Burlington Scott	Toronto McGill	Troy University (Faculty) Banting Postdoc(McGill)
2011	Kurkela Taoso	McGill UBC	
2012	Ghirglieri Shuve	McGill McMaster/PI	
2013	Morrison Bhattacharya	McGill Montréal	

Other ideas for theory support from IPP

- Consultation with the theory communities

- Some ideas put forward:

  - Money for international visitors.

  - Fellowship for a speaking tour by postdoc and student.

  - Travel Fellowship for postdoc and student to spend time at another institution.

Early Career Development Fellowship

- Awarded in a national competition it will provide funds for students and postdocs to spend some time at an international lab, school or institute.

- Proposed budget: $ 35, 250 (3 two-weeks, 3 one-month, 1 four-month trips)

- No more than 2 awards per institution per year.

- Pilot program for 5 years

Benefits

- Increases international exposure of theory students and postdocs.

- Encourages international collaboration of faculty members.

- Helps the students and postdoc to promote their career (prestige of winning a nationally competitive fellowship, letter of recommendation, etc…)

- Attractive feature for potential students and postdocs.

- Complementary to existing programs.

Benefits

- In line with NSERC 2020 priorities.

- Will benefit a large number of people.

- Can be beneficial to theory groups of all sizes.

Outcome of the IPP MRS grant renewal

- The early career fellowship received very positive comments from the review panel.

- However the new MRS grant is not large enough to cover the cost of the program.

- Can the program be funded from other sources?

- Other programs?