LHC Theory Initiative
2005 Proposal to NSF

Jonathan Bagger, PI
Ulrich Baur, R. Sekhar Chivukula,
Lynne H. Orr, co-PIs

Madison, WI
May 17, 2006

More info: www.pas.rochester.edu/~orr/LHC-TI.html
Many thanks to our Madison hosts for sponsoring this meeting once again!

Special thanks to:
Tao Han
Linda Dolan
Maureen Friend
Goals of the Program

• Fully exploit physics potential at LHC. (No-brainer, given already large US investment in LHC experiments.)

• Increase funding-agency support of LHC-related theory in US ($$).

• Increase academic and lab-based support for LHC-related theory in US ($$, faculty positions, improved climate).

• Support young scientists, and improve recruitment and retention in LHC-related theory.

• Add value beyond simply beefing up existing programs

• Achieve broad-based community buy-in and participation.

• Maximize bang for the buck
  • direct costs: optimize
  • indirect/administrative costs: minimize

• Make an impact on LHC physics soon. (2007 is next year!!)
Constraints/tradeoffs

• $$: \textbf{NSF theory budget } O($10M)/year. \text{ If renewals only: } $3M/year. \text{ (Good news: Dehmer wants to increase 5%/year.)}$$
  
  \text{LHC Theory Initiative could be a part (a good proposal could bring in more money).}

• Total $$ vs. \text{ impact}
• No. of fellowships vs. level of support
• Faculty support: desirability vs. cost-effectiveness
• Share the wealth vs. rich get richer
• Prescribed research vs. independence for bright, creative youngsters
• Accommodate diverse opinions vs too many things to too many people

\textbf{Compromise: postdoc and grad student fellowships.}
October 2005 Proposal to NSF: Summary

• Prestigious postdoc and graduate student fellowships awarded through nationwide competition
• Funding includes salary, research support
• Faculty support desirable but too costly

• Fellowship program:
  • Mentoring by faculty sponsor
  • Semiannual Fellows’ meetings
  • Regular videoconferences, smaller groups
  • Aim for theoretical working groups with Fellows in leadership roles
  • Technical training and professional development
  • Networking with US theoretical and experimental LHC communities

• Desired career path: tenure-track faculty

Fellows nucleate vital LHC theory community
Postdoctoral Fellowships: Nomination Process

• Fellowship: $150K total, 2 or 3 years

• Eligibility: any US institution can nominate a Fellow

• Nomination includes:
  • Research plan from nominee
  • Support letter from faculty sponsor/mentor, with
    • Qualifications of nominee
    • Project description
    • Relation to existing/planned theoretical collaborations
  • Endorsement letter from institution, with
    • Description of financial and other support
    • Budget for spending fellowship funds (guidelines below)
  • 2 additional letters of recommendation

• Collaborative nominations (multiple institutions) encouraged
  • Requires 2nd endorsement letter
**Graduate Student Fellowships: Nomination Process**

- Fellowship: $40K, 1 year

- Eligibility: any US institution can nominate a Fellow

- Nomination includes:
  - Research plan from nominee
  - Support letter from faculty sponsor/mentor, with
    - Qualifications of nominee
    - Project description
    - Relation to existing/planned theoretical collaborations
  - Endorsement letter from institution, with
    - Description of financial and other support
    - Budget for spending fellowship funds (guidelines below)
  - 1 additional letter of recommendation

- Collaborative nominations (multiple institutions) encouraged
  - Requires 2nd endorsement letter
Budget guidelines for fellowships

Postdoc:  
- Funds: $150K total, 2 or 3 years  
- Salary support  
- Fringe benefits  
- Research support: $4K min  
- Host inst. admin fee: $10K max  

Grad student:  
- Funds: $40K, 1 year  
- Salary support  
- Fringe benefits  
- Tuition  
- Research support: $4K min  
- Host inst. admin fee: $5K max  

- Exact distribution of funds to be determined by nominee and institution and specified in proposal  
- Funds follow fellow  

Examples:

<table>
<thead>
<tr>
<th></th>
<th>Postdoctoral Fellowship</th>
<th>Graduate Fellowship</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Example 1 (2-year)</td>
<td>Example 2 (3-year)</td>
</tr>
<tr>
<td>Salary/stipend</td>
<td>$50k+$50k</td>
<td>$55k+$15k+$15k</td>
</tr>
<tr>
<td>Fringe benefits</td>
<td>$15.5k+$15.5k</td>
<td>$17k+$4.7k+$4.7k</td>
</tr>
<tr>
<td>Tuition</td>
<td>$9k</td>
<td>$28.6k</td>
</tr>
<tr>
<td>Research funds</td>
<td></td>
<td>$6k</td>
</tr>
<tr>
<td>Adm. fee</td>
<td>$10k</td>
<td>$5.7k</td>
</tr>
<tr>
<td>Total</td>
<td>$150k</td>
<td>$150k</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$40k</td>
</tr>
</tbody>
</table>
Selection of Fellows

- **Selection committee:** 7 members chosen by LHC-TI Steering Committee from US LHC community (1 or 2 year terms; selection committee members can not nominate fellows)
- ~4 postdoctoral, ~6 graduate fellows/year
  - Exact numbers to depend on applicant pool, funding availability
- **Selection criteria:**
  1. Quality of nominee
  2. Quality of project
  3. **Relevance of proposed work to LHC**
  4. Support committed by institution, including synergy with group
  5. Potential for impact on institution as LHC center of excellence
  6. Potential for project to nucleate active theoretical working group
- Postdoc awards to be *coordinated with postdoc hiring cycle* (December)
- **Diversity:** Nomination of members of underrepresented groups to be encouraged and best practices for unbiased review to be followed
- **Institutional limit** of max 1 new postdoc and 1 new grad fellow every other year; max 1 grad and 1 postdoc nomination/faculty member/year
- **Individual limits:**
  - 1 nomination/year can be accepted
  - Lifetime limit of 2 grad and 1 postdoc fellowship
Management Structure

• **Grant administered through Johns Hopkins University** for flat admin fee $25K/year in lieu of overhead
• Fellowships distributed as **subawards**, with faculty sponsors as subaward PIs
• **Scientific management:**
  • PI, co-Pis primary responsibility
  • LHC-TI Steering Committee advises, chooses fellowship selection committee
• Execution of fellowship program:
  • Fellowship solicitation
  • Scheduling of meetings and program arrangement
• **Executive committee:**
  • J. Bagger
  • U. Baur (co-chair)
  • S. Chivukula
  • J. Hewett
  • I. Hinchliffe
  • L. Orr (co-chair)
  • M. Schmaltz
Overall Budget

- Five years total
- 4 postdoctoral fellows @ $150K: $600K
- 6 Graduate student fellows @ $40K: $240K
- JHU admin fee: $25K
- Printing, mailing announcements: $400
- Advertising: $2500
- Travel for selection committee (@$750): $5250
- Total/year: $873K

What a deal! No support for senior faculty or committee members, and administrative costs kept to minimum. Almost all funds go to youngsters.
Letters of Support

A wide variety of institutions and organizations provided letters of support; several agreed explicitly to the overhead caps.

- US ATLAS
- US CMS
- Florida
- FNAL Theory Division
- ANL HEP Division
- Stony Brook
- BNL Physics Division
- William and Mary
- Wisconsin
- Oklahoma State
- UC Berkeley
- Yale
- Harvard
LHC-TI Steering Committee

- J. Bagger (Johns Hopkins)
- U. Baur (SUNY Buffalo)
- S. Chivukula (Michigan State)
- S. Eno (Maryland; CMS)
- W. Giele (FNAL)
- J. Hewett (SLAC)
- I. Hinchliffe (LBNL)
- P. Langacker [chair] (Penn)
- S. Mrenna (FNAL)
- F. Olness (Southern Methodist)
- L. Orr (Rochester)
- J. Parsons (Columbia; ATLAS)
- M. Schmaltz (Boston)
- C. Wagner (ANL, Chicago)
- E. Witten (IAS)