

**Snowmass 2013  
Energy Frontier  
Conveners Meeting**

**April 4, 2013**

1. Schedule; responsibilities
2. Saturday
3. Regular phone meeting time
4. Invitations to Seattle
5. Fast simulation framework
6. Sessions/Topics in Minnesota
7. Questions
8. Discovery stories
9. White paper on physics abroad
10. Panel discussion

## 1. Schedule

### Seattle meeting June 30

We would like you to present a bulleted list of the major conclusions of your working group. We will schedule plenaries for the presentation of these conclusions and feedback. We will also schedule a parallel session for each working group to discuss and refine these.

Chip and Michael would like to see a draft of this list by **June 15**.

**July 15:** due date to send a first draft of your 30 page report to Chip and Michael. We will distribute these to the whole convener group, maybe after 1 round of revision, but certainly well before Minnesota.

**July 24:** Michael and Chip will distribute a first draft of the 30 page overall summary of Energy Frontier

### Minnesota meeting July 29

A finished draft of your report should be available to be made public. Chip and Michael will present the major conclusions of all working groups in the opening plenary session.

The Frontier conveners will stay in Minnesota **August 7-9** and complete their summary reports. These will be presented at DPF on **August 16**.

The **final** version for all reports will be due **August 30**.

The Frontier-level summary reports and the overall summary from Jon Rosner will receive editing from a professional science writer. This person will give feedback on presentation.

The final, final versions of the summary reports will “go to press” in **mid-October**.

Chip and Michael emphasize that you will own your working group reports. You have the final decision about all conclusions in these reports, and they will be public documents. We will reflect your conclusions in our summary report.

## 2. What should you present on Saturday morning?

30 minutes for each working group -- please: 25+5 !

speakers: QCD - Huston  
Top - Melnikov  
Electroweak - Schmitt  
Higgs - Logan  
Flavor - Papucci  
New Phenomena -

content:

3-4 highlights of this meeting: Thank people who came from afar and/or did serious work

what are the major focus points of your study ?

what are the major controversies that still need to be resolved ?

how will you get from here to there ? Give us a list of projects that **must** be finished by June 30.

### 3. Regular phone meeting

We need a regular Energy Frontier conveners phone meeting time for the period between now and Minnesota. We propose:

Monday	10 am / 1 pm	11 am / 2 pm	PDT / EDT
Thursday	10 am / 1 pm	11 am / 2 pm	
Friday		11 am / 2 pm	

Let's vote and choose one.

Meeting will be by ReadyTalk. Chip and Michael will circulate the agenda beforehand. Please send us any needed agenda items.

No meeting next week. We will start in the week of April 15.

#### 4. Invitations to Seattle

Robin Erbacher has pointed out that we need more outreach to the HEP community. Many people feel that they are not included in the Snowmass study.

Robin suggested that Chip and Michael send personal invitations to some senior people to attend the Seattle meeting. It is an excellent idea. **Everyone, please send us your list of people who should be invited.**

## 5. Fast simulation

We have made a serious effort for this meeting to make sure that a usable fast simulation framework is in place. We are very grateful to [Sergei Chekanov](#), [Sanjay Padhi](#), [Ashutosh Kotwal](#), and [Meenakshi Narain](#) who did a huge amount of work on the DELPHES-3 framework and took a large amount of flak for various choices made in the implementation.

We need to finalize all details of this framework at this meeting. Instructions and sample scripts need to be posted on the wiki as soon as possible.

So, if you have any questions or complaints about the formalism, now is the time to raise them.

For [lepton colliders](#), are the fast simulation resources adequate? If not, let us know.



## 6. Sessions and topics for discussion in Minnesota

What is the purpose of the Minnesota Snowmass meeting ?

We hope that our working group reports will be done (or in late-stage draft) by Minnesota. We will present them there to the broader HEP community.

Minnesota is the only common meeting of all Frontiers. It would be a shame to spend this meeting in isolated working groups. We need to use this meeting to educate one another across the Frontier boundaries.

We, the Energy Frontier conveners, need to define topics that we would like to present in parallel sessions at Minnesota. These topics should be chosen to highlight controversial topics and topics that have broad interest.

We need to agree on the best list of these topics and propose parallel session on these topics in Minnesota.

The Minnesota meeting will also feature daily panel discussions on the highest-level issues. We should propose topics for these.

questions within our Frontier:

What is the future of precision Higgs boson measurements? What can LHC do? What are the goals required by the physics? How can we get there?

What is the ultimate reach of the LHC for supersymmetry? When do we give up?

How accurately can we measure the top quark mass? What does it mean to measure the top quark mass? How does the answer to this question affect the systematic error?

questions across Frontiers:

What is the global picture of the study of dark matter over the next 15 years. Energy Frontier will contribute; how?

How do we compare the reach of  $\mu \rightarrow e$  conversion experiments in searching for new physics to the reach of direct searches for new particles?

## 7. Questions

Jon Rosner has asked for questions from the Frontier conveners, to be asked to the conveners of other Frontiers.

The Cosmic Frontier group has given a very interesting list of tough questions.

Please generate your list of questions and send it to Chip and Michael. These can be at “stick in your eye” level. Using Chip’s tact (not Michael’s forte), we will edit these down to “hot seat” level.

Jon has requested these by April 15, so we must iterate by email.

## 8. Discovery stories

We need to decide now whether we will use the idea of “discovery stories” enunciated by Chip in his talk will be used in our writeups. We need to iterate between now and the end of April on what “discovery stories” we collectively agree to highlight.

1.  $W$  mass too heavy to be consistent with the Standard Model

2.  $WW$  production cross section:

$$\sigma(WW) = 1.2 \pm 0.05 \times \sigma(\text{SM})$$

3.  $t$ - $t$ bar resonance enhancement

$$M(tt\text{bar}) = 1.8 \text{ TeV}$$

4. Higgs “signal strength” for fermions

$$\mu(\tau\tau \text{ and } bb) = 0.5 \pm 0.1$$

5. Enhancement in the dijet invariant mass

$$M(jj) > 6000 \text{ GeV}$$

6. A narrow dilepton invariant mass enhancement

$$M(\ell\ell) = 3000 \text{ GeV}$$

7. A wide dilepton invariant mass enhancement

$$M(\ell\ell) = 2500 \text{ GeV and at a } \sigma(\ell\ell) = 5\% \text{ that of a sequential } Z'$$

8. A dark matter direct detection signal at  $2 \text{ zB}$ ,  $200 \text{ GeV}$  WIMP.

Can we do this or something in this spirit?

## 9. White paper on Physics Abroad

Chip and I feel that it is very important to write a white paper that explicitly discusses the question of why the US should be involved in experiments at accelerators in other regions.

In this paper, we would like to emphasize the intellectual benefit to the US of involvement in the top questions in physics, the fact that most of the money is spent in the US, the benefits to US high-tech capabilities, and the fact that, the world being more connected, it is not so difficult to engage with a global collaboration.

The outline of this paper will be:

- Introduction

- Contributions to detectors

- Contributions to accelerators

  - (Mike Harrison volunteered to discuss US involvement in LHC, LHC upgrades, and ILC)

- Physics analysis, working style of university groups

- Conclusion

Chip and Michael need your contributions to this document.

For example,

The component XXX of the ATLAS detector was built in my laboratory. This detector had capabilities that could not be purchased from industry. We worked with YYY company to achieve them. Undergraduates did the assembly and testing. The postdoc who supervised the project is now working at ZZZ.

My group made a crucial contribution to the component AAA of the Higgs discovery, in collaboration with groups from Japan, Spain, and India. We developed the method through weekly EVO/Skype meetings. Our students gained unique experience in global collaboration.

My university has an assistant provost for global outreach. That person was amazed to learn how strongly my group is integrated into a global collaboration.

We need to collect these stories. Ask your friends and colleagues. The author list for the white paper is open.

Due date for the input data: May 1

We hope to have a complete draft for discussion at the Seattle meeting.

## 10. Panel discussion

Chip and Michael are grateful to Andrei, Robin, Markus, and Ashutosh for articulating the goals of Energy Frontier at the panel discussion, and to Raman and Nima for participating.

What did we learn ? What are the strong and weak points of our argument ?

Please discuss.



This turned out to be a very exciting meeting, with high intellectual value. It is the most stimulating Snowmass meeting so far.

Thank you !

Let's keep pushing toward Minnesota.