

ICFA報告

2015/10/15

森俊則@LC計画推進委

- ・ **有識者会議「これまでの議論のまとめ」への対応**
 - ・ 6月のFALCでの説明、初期ドラフトの流布などにより非常にネガティブな印象
 - ・ 指摘された物理および技術面の課題については、世界の素粒子物理学コミュニティとして速やかに対応すべき
 - ・ ICFA議長より有識者会議議長へ会議後すぐに手紙を送り、「a short document to clarify some of the issues and questions raised in your summary」を今年終わりまでに送ること、さらに今後の協力を約束。
- ・ **文科省による調査（NRIに委託）への協力と対応**
- ・ **ILCに必要なマンパワーについて各主要加速器研究所の状況をまとめている**
- ・ **LCB / LCC のmandateについて**
 - ・ 来年2月に3年の任期が切れるが、今後も継続が必要である
 - ・ 現体制で1年任期延長、その間に新体制について検討、来年夏に決める
- ・ **CLIC ; FCC、CEPCについて**

3. 提言

- ・ これまでの作業部会での検討・報告、有識者会議での議論を踏まえ、ILC計画に関して有識者会議として以下を提言する。

- ・ **提言1** ILC計画は巨額の投資が必要であり、一国のみで実現することはできず、国際的な経費分担が必要不可欠な計画である。巨額の投資に見合う科学的成果が得られるべきであるとの観点から、標準理論を超える新展開のために、ヒッグス粒子及びトップクォークの精密測定のみならず、新粒子の発見の可能性についても見通しを得るべき

- ・ ○ ILC計画はヒッグス粒子、トップクォークの精密測定及び新粒子の探索により標準理論を超える物理を探索する計画であり、標準理論を超える物理の発見があった場合、素粒子物理学上の科学的意義は大きい。

- ・ ○ ILC計画が巨額の投資が必要な計画であることに鑑み、その実施の前提として、欧米等の具体的な参画及び経費分担について明確な見通しを得ることが必要不可欠である。

- ・ ○ 巨額の投資に見合う科学的成果が得られるべきとの観点から、標準理論を超える素粒子物理学の新展開のために、ヒッグス粒子及びトップクォークの精密測定のみではなく、暗黒物質の候補となる超対称性粒子などの標準理論を超える新粒子の探索についても、見通しを得ることが必要である。

(有識者会議「これまでの議論のまとめ」)

- ・ ○ 国際協力における経費負担の在り方については、従前のCERNの方式だけでなく、国際熱核融合実験炉(International Thermonuclear Experimental Reactor、ITER)、国際宇宙ステーション(International Space Station、ISS)等のこれまでの国際大型プロジェクトの事例及びILCを巡る国際動向を踏まえて検討を進めることが適当である。

- ・ **提言2** ILCの性能、得られる成果等については、2017年末までの計画として実施されているLHCでの実験結果に基づき見極めることが必要であることから、LHCの動向を注視し、分析・評価すべき。併せて、技術面での課題の解決やコスト面でのリスクの低減について、明確にすることが必要

- ・ ○ ILCの性能や得られる成果等については、2017年末を目途として実施されている13TeV運転によるLHC実験の結果によって異なってくる。特に、新粒子が発見されるか否か、また新粒子が発見された場合はその質量が重要な判断材料となる。

- ・ ○ 作業部会等で指摘された技術面及びコスト面での課題については、その解決に向けた取組により、より明確な見通しを得ることが必要である。

- ・ ○ また、加速器性能の高度化につながる技術開発の成果を最大限取り入れる努力を強化すべきである。

- ・ **提言3** 提言1及び提言2に関する事項を含めて計画の全体像を明確に示しつつ、国民及び科学コミュニティの理解を得ることが必要

- **Recommendation 1:** The ILC project requires huge investment that is so huge that a single country cannot cover, thus it is indispensable to share the cost internationally. From the viewpoint that the huge investments in new science projects must be weighed based upon the scientific merit of the project, a clear vision on the discovery potential of new particles as well as that of precision measurements of the Higgs boson and the top quark has to be shown so as to bring about novel development that goes beyond the Standard Model of the particle physics.
- The objective of the ILC project is to uncover physics beyond the Standard Model through the precision measurements of the Higgs boson and top quark and through searches for new particles. In case of new discoveries beyond the Standard Model, its scientific impact on elementary particle physics will be significant.
- As the ILC project requires huge investment, it is indispensable and essential prerequisite for the implementation to have a clear vision of participation and cost sharing by international partners including European countries and the United States while taking into account mid-term and long-term domestic economic and financial situations.
- From the viewpoint the huge investments in new science projects must be weighed based upon the scientific merit of the project, it is necessary to have a clear strategy of the discovery potential of new particles such as supersymmetry particles which are considered as a candidate of the dark matter, in addition to that of precision measurements of the Higgs boson and top quark, has to be shown so as to bring about novel development that goes beyond the Standard Model.

(同英語版)

- It is appropriate to proceed discussion on a possible international cost sharing scheme of the ILC project by not only taking into account the scheme used by CERN but also taking into account the schemes of existing large scale international projects such as the International Thermonuclear Experimental Reactor (ITER) and International Space Station (ISS).
- **Recommendation 2:** Since the specifications of the performance and the scientific achievements of the ILC are considered to be designed based on the results of LHC experiments, which are planned to be executed through the end of 2017, it is necessary to closely monitor, analyze and examine the development of LHC experiments . Furthermore, it is necessary to clarify how to solve technical issues and how to mitigate cost risk associated with the project.
- The specifications of the performance and the scientific achievements of the ILC project depend on the results of LHC experiments in the 13TeV run which is currently going on through the end of 2017. Especially whether new particle(s) can be found or not, and what their mass value(s) would be in case of the discovery, will provide important viewpoint for the judgement.
- It is important to show a clear outlook to address technical and cost issues pointed out at the working group discussions.
- It is recommended to further enhance the maximum efforts to incorporate technology development that can improve the accelerator performance.
- **Recommendation 3:** While presenting the total project plan, including not only the plan for the accelerator and related facilities but also the plan for other infrastructure as well as efforts pointed out in Recommendations 1 & 2, it is important to have general understanding on the project by the public and science communities.

27 August 2015

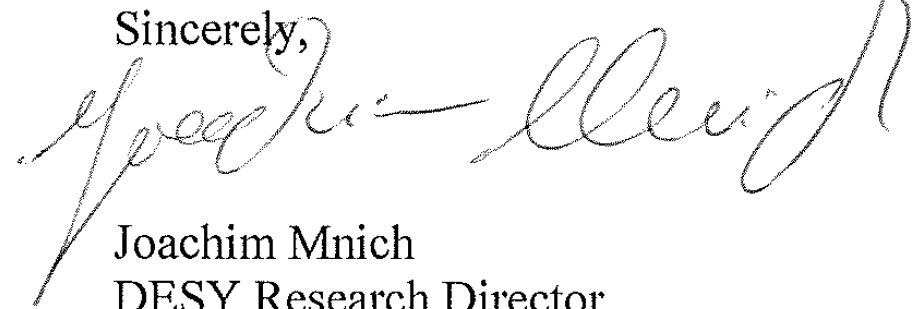
The chair of the International Linear Collider Advisory Panel
Professor Shinichi Hirano
sokaku@mext.go.jp

Dear Prof Hirano:

At its recent meeting, the International Committee for Future Accelerator ICFA,¹ composed of directors of leading international particle physics laboratories and representatives of the world-wide particle physics community, discussed the document “Summary of the International Linear Collider (ILC) Advisory Panel’s Discussions to Date” produced by your panel. ICFA thanks you for the significant effort by you and the panel to study the ILC and its possible realisation in Japan. We appreciate your very important summary document which indicates the serious interest of Japan in hosting a linear collider and which we take as an encouragement for the work of the worldwide ILC community.

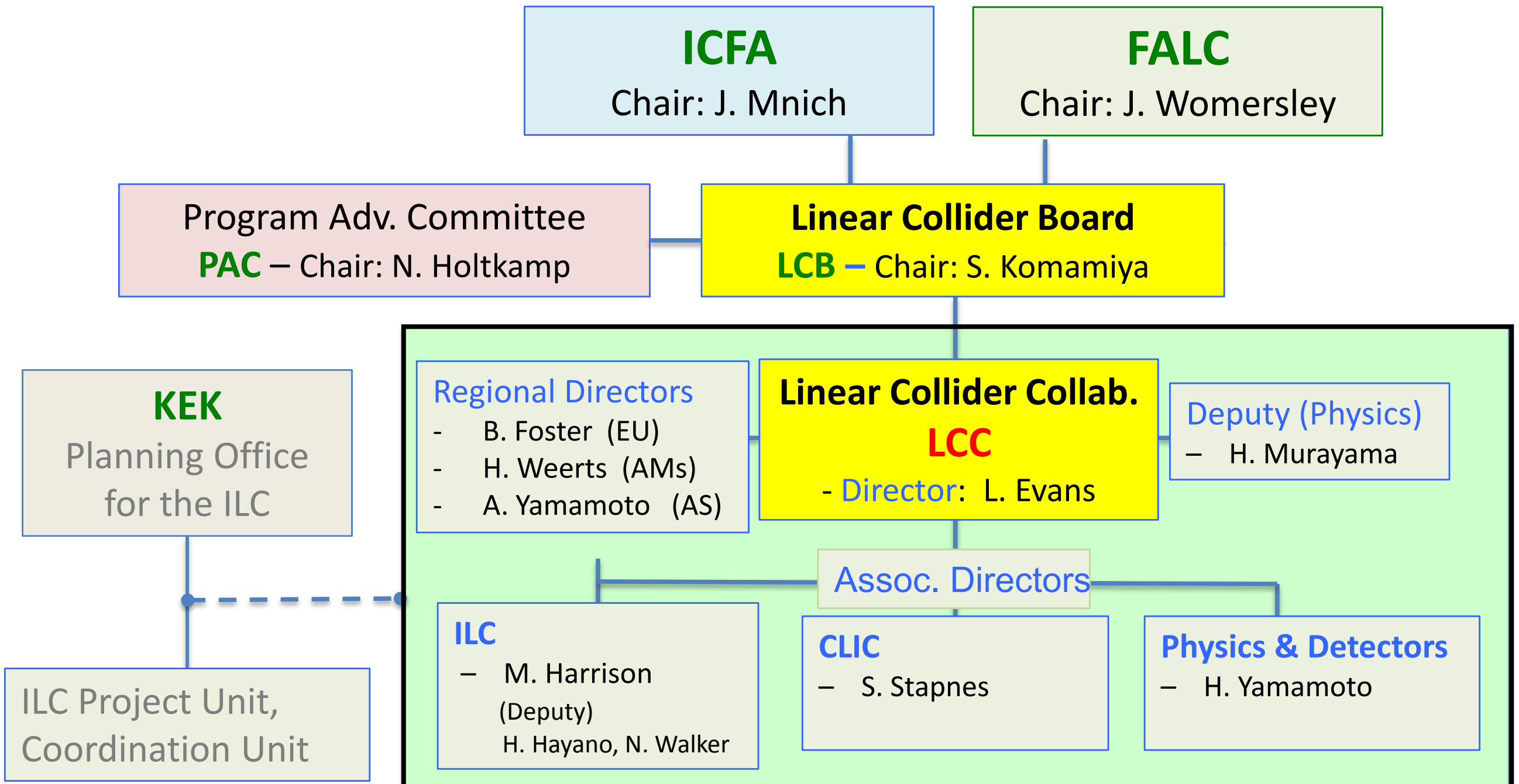
ICFA is preparing a short document to clarify some of the issues and questions raised in your summary. The document will be submitted to your panel before the end of this year. We would be pleased to assist in obtaining further information in case the need arises in the course of your investigations.

Sincerely,



Joachim Mnich
DESY Research Director
Chair of ICFA

cc: Mr. Sdahiro Hagiwara, MEXT, shagiwa@mext.go.jp
cc: Mr. S. Yoshii, MEXT, s-yoshii@mext.go.jp



ICFA Statement on its Support of the ILC, its Endorsement of the Strategic Plans of Europe, Asia and the United States, and its Encouragement of International Studies of Future Circular Colliders

ICFA endorses the particle physics strategic plans produced in Europe, Asia and the United States and the globally aligned priorities contained therein. Here, ICFA reaffirms its support of the ILC, which is in a mature state of technical development and offers unprecedented opportunities for precision studies of the newly discovered Higgs boson. In addition, ICFA continues to encourage international studies of circular colliders, with an ultimate goal of proton-proton collisions at energies much higher than those of the LHC.

6 July 2014