Heavy Ion Alert is an international group of critics - including Swiss - concerned about the insufficiency of existing safety arguments regarding LHC heavy ion collisions - between lead nuclei - and the unsatisfactory nature of the associated regulatory process.

Heavy Ion Alert's Appeal to the Control Committees (p. 2)

We had sent a letter to the Control Committees of the Swiss Federal Assembly. These Control Committees have a parliamentary oversight role relating to the governing Swiss Federal Council, the Federal Administration, the Federal Courts and other bodies entrusted with tasks of the Confederation.

We outlined two concerns in our letter. The first related to the failure in CERN's safety review (LSAG-report) for its safety arguments to be compatible with the independent statements of CERN's own researchers. These relate to LHC's potential production of particles with established risk associations - known as strangelets. The other concern was that, in reply to a question from members of the Federal Assembly, the Federal Council had misinformed them that both the LSAG and the Scientific Policy Committee (SPC),who reviewed the LSAG report, were independent of CERN. We urged the Control Committees to investigate both these grave concerns.

Reply from the Control Committees (p. 8)

Concerning the issue of strangelets risk, the Control Committees instead referred to 'tiny black holes' (micro black holes) - which we never mentioned - and regarding the safety of CERN's research, the Control Committees indicated that they had no powers of supervision over CERN itself. They further claimed that our concerns regarding independence were open to question and not warranting their intervention.

Heavy Ion Alert's Open Letter Response to the Control Committees (p. 10)

Relating to our concern that the important strangelet issue of our letter had apparently not been read, we indicated that SERI (the Secretariat for Education, Research and Innovation) is a part of the Federal Administration, so therefore becomes part of the Control Committees' supervisory remit. Further, we detail various systemic neglects in the way the Federal Council deals with such risks. We also provide detailed evidence for the lack of independence from CERN of both LSAG and the SPC. We make recommendations that include the commissioning of a genuinely independent, multidisciplinary panel to review the safety of the LHC.

Secretariat of the Control Committees
Parliament Building
CH -3003 Bern

[Address of Signatory]

[5 February 2011]

Dear President Roth-Bernasconi, dear President Janiak, dear members of the Control Committees

On behalf of the Heavy Ion Alert network I would like to request that the Control Committees investigate the following two issues:

1) Whether heavy ion collisions at the Large Hadron Collider are capable of producing strangelets, that could pose a threat to Switzerland and the world.

2) Whether the Federal Assembly was misinformed about the independence and objectivity of the committee responsible for the current safety assessment of the LHC.

Issue 1 - Strangelet Production at the LHC

Attached to this text is a recent report by Eric Penrose from the board of Heavy Ion Alert. It reviews the safety arguments concerning strangelets presented by CERN and accepted by the Federal Council. The report contains a review of CERN's arguments an*d* demonstrates how they are contradicted by statements in the scientific literature, as well as by statements of scientists from CERN and by CERN's own actions.

Strangelets are a form of matter which was hypothesized by physicists to explain a phenomenon observed in cosmic rays. Throughout the ‘80s and ‘90s there were numerous attempts by physicists to produce both positively and negatively charged strangelets through collisions at particle accelerators. These attempts were conducted fairly openly and within the physics community there was a great deal of excitement about the possibility of creating a completely new form of matter.

In the year 1999 - following the publication of a short scientific article by the later Nobel laureate Frank Wilczek which mentioned that strangelets could conceivably threaten the planet, there was widespread public concern about whether the generation of such objects could be potentially dangerous.

Experts closely associated with the largest of these experiments, the 'Relativistic Heavy Ion Collider' (RHIC) in New York and the 'Large Hadron Collider' (LHC) in Geneva, quickly assured the public that there was no great risk, and they stated that such experiments should be allowed to continue.

The possibility of strangelet production at the LHC was reviewed at length in the report of the 'LHC Safety Assessment Group' (LSAG) which was released on June 20th, 2008. The issue of strangelets was considered in section 5 of the main report and in a special addendum devoted exclusively to strangelets. The unanimous conclusion of the LSAG's report was that it would probably not be possible to produce strangelets at the LHC. This conclusion is repeated on CERN's website, which states:

‘Strangelet production at the LHC is therefore less likely than at RHIC, and experience there has already validated the arguments that strangelets cannot be produced.’

On the other hand, the LHC has a specialized detector, called CASTOR, which has been designed specifically to identify and study strangelets, which could be produced in heavy ion collisions.

Even the ‘ST’ in ‘CASTOR’ [Centauro And STrange Object Research] proves its official function. This contradicts CERN's claim that ‘strangelets cannot be produced’. Scientists responsible for this detector have predicted production rates on the order of 1 strangelet per 1000 collisions at the LHC, which over the lifetime of the experiment would mean the creation of 10,000,000 strangelets.

Although this is a technically complicated and highly specialized field, one does not need to be a physicist to recognize the obvious contradiction between CERN's claim that strangelets cannot possibly be produced and the statement of its scientists that strangelets could be produced in large numbers. Thus far, no attempt has been made by CERN to resolve this contradiction. Criticism regarding this has been ignored and the experiment started anyway.

Just as disturbing is the silence of many physicists associated with the LHC. In the December 2007 edition of ‘CMS Times’ (the internal newsletter of the ‘[Compact] Muon Solenoid’ collaboration), a Greek physicist speaking on behalf of the CASTOR detector [project] plainly stated that strangelets would probably be produced at the LHC. Just six and a half months later CERN's official safety report claimed that previous experiments at lower energies proved that it is impossible for strangelets to be produced. It is therefore a legitimate expectation that the physics community would publicly demand a clarification of these contradictory views. So far, physicists associated with CERN and the LHC have kept quiet about this issue in public.

The reality of this situation is that governmental oversight of this project has been inadequate. If the member states of CERN permit the organization to assert something which is quite obviously false, there is effectively no control over the project, and CERN is free to do whatever it wishes, regardless of the consequences.

The special responsibility of our country in this matter becomes evident when one considers that all other countries expect us to play a key role in the regulation of the LHC. In a letter ‘Heavy Ion Alert’ recently received from the U.S. Department of Energy it was stated that:

‘After a detailed application process, operation of the LHC has been approved by the nuclear regulatory authorities of the host countries, Switzerland and France.’

This official statement from the Government of the United States clearly demonstrates the responsibility that we bear in this matter for the entire world. It should be ensured that the risks associated with the LHC are accurately and responsibly assessed.

Aside from the main question of whether strangelets can be produced, the attached repor*t* also documents the following contradictions in CERN's official statements about the safety of the LHC:

* CERN claims that the risk of strangelet production at the LHC would be lower than at previous colliders, whereas scientists working at CERN say that the probability is greater.

* CERN claims that a particular model for strangelet production has now been abandoned for the LHC, whereas scientists operating experiments there, consider that same model to be one of the most likely pathways for strangelet production.

* CERN claims that negatively charged strangelets - according to the latest state of knowledge probably the most dangerous type - are extremely unlikely, whereas scientists that collaborate with CERN are predicting the production of negative strangelets at the LHC.

* CERN claims that it is very unlikely that small strangelets could be stable or long-lived, but scientists at CERN report various ways in which even small strangelets could be stable.

* CERN claims that nuclear collision experiments and observations of cosmic rays have not yielded any evidence at all for the existence of strangelets, but scientists working at CERN refer to significant experimental evidence for their existence.

* CERN claims that naturally-occurring cosmic ray collisions demonstrate the safety of the LHC, even though scientists working at CERN state that the heavy ion collisions at CERN 'can be expected to show exotic phenomena that is beyond the reach of cosmic rays'.

The details of these contradictions are presented in the attached report, which also provides direct links to the original quotations and documents. Any further evidence or documentation required by the Control Committees, we will readily provide.

Issue 2 - Independence or dependence of the LHC Safety Assessment Group (LSAG)

A central issue bearing on not only the risk of strangelet production but also the risk of other dangerous effects of the LHC is the question of whether the project's official safety report was prepared by an objective and independent committee.

The Federal Council has assured the Federal Assembly that the committee responsible for the safety report was an independent one. On 26 November 2008, in response to a question submitted by National Council members Vischer, Bänziger, Daguet, Frösch, Gilli, Hämmerle, Lang, Leuenberger, Schelbert, Schmid-Federer, Steiert, and Teuscher, the Federal Council stated the following:

de
'Gerade weil es auch der Cern-Rat als absolut zentral angesehen hat, die möglichen Risiken im Zusammenhang mit dem Betrieb des LHC genau zu kennen, hatte er das Cern-Management in dessen Bestrebungen unterstützt, den Sicherheitsbericht aus dem Jahr 2003 im Lichte neuer experimenteller Ergebnisse und eines vertieften theoretischen Verständnisses auf den aktuellen wissenschaftlichen Stand zu bringen. Das Cern hat daher dieses Jahr die Arbeitsgruppe Sicherheit am LHC, WELCHE AUS CERN-UNABHÄNGIGEN EXPERTEN ZUSAMMENGESETZT IST, mit dieser Aktualisierung beauftragt.' (Hervorhebung hier hinzugefügt)

fr
'Le conseil du CERN a lui aussi considéré qu'il était capital de connaître les risques potentiels inhérents à l'exploitation du LHC; c'est pourquoi il a soutenu la direction du CERN dans ses efforts pour mettre à jour le rapport de 2003 sur la sécurité à la lumière de nouveaux résultats expérimentaux et d'une approche théorique approfondie. Le CERN a confié, en 2008, l'actualisation de ce rapport à un groupe de travail "Sécurité du LHC" COMPOSÉ D'EXPERTS INDÉPENDANTS DU CERN.' (Mise en relief ajoutée)

it
'Peraltro, riconoscendo l'importanza di individuare con esattezza I rischi potenziali legati all'uso dell'acceleratore LHC, il consiglio del CERN ha sostenuto la direzione dell'organizzazione nel suo

impegno per aggiornare il rapporto sulla sicurezza del 2003 alla luce di nuovi risultati sperimentali e di conoscenze teoriche più approfondite. Nel 2008 il CERN ha quindi affidato l'aggiornamento del rapporto al gruppo di lavoro “Sicurezza dell'acceleratore LHC”, COMPOSTO DI EXPERTI INDEPENDENTI dall'organizzazione.’ (l'evidenziazione è nostra)

[en]
'Precisely because the CERN Council also regards it as absolutely essential to accurately understand the possible risks involved in the operation of the LHC, it has supported the efforts of CERN's management to update the 2003 safety report to the current state of scientific knowledge in the light of new experimental results and a deeper theoretical understanding. CERN has therefore this year [2008] mandated the LHC Safety Assessment Group, WHICH IS COMPOSED OF CERN-INDEPENDENT EXPERTS with this updating.' (Emphasis added)

The LSAG group was composed of the following scientists:

* John Ellis (senior member)

* Michelangelo Mangano (spokesperson)

* Urs Wiedemann

* Gian Giudice

* Igor Tkachev

If one examines the background of each of these physicists, it becomes clear that not one of them can be considered independent.

* John Ellis - A brief glance in Wikipedia reveals that Prof. Ellis has been employed at CERN since 1978. It is also noteworthy that he has twice been the Deputy Division Leader of CERN's theory division, and for six years has been the leader of this division. He is also deeply involved in the recruitment and integration of a number of non-European states into the LHC. In addition to the information available on Wikipedia, the minutes of the LHC Committee (LHCC) meetings show that Professor Ellis has been a member of that Committee from its inception until the spring of 1997. Altogether, Professor Ellis has dedicated more than 25 years of his life to the LHC project. By no standards can he be considered an independent and disinterested party for an assessment of the LHC's safety.

* Michelangelo Mangano - Dr. Mangano joined CERN in 1995 and is presently a ‘Senior Member’ of the organization's theory division.. For more than a decade before the release of the LHC's safety report, Dr. Mangano had officially participated on behalf of CERN in discussions about the physical discoveries anticipated from the LHC. Like Professor Ellis, Dr. Mangano has also been a member of the LHCC – the central body for the management of the LHC. Dr. Mangano has been a member of that committee from 2001 until the present. As with Professor Ellis, Dr. Mangano also cannot be considered an independent and disinterested party.

* Urs Wiedemann - Prof. Wiedemann has been a member of CERN's theory division since 2000, with specialization in the physics of particle accelerators and in heavy ion physics. Professor Wiedemann is one of the organizers of the ‘CERN Heavy Ion Forum’ and was a leading member of the ALICE collaboration. As a CERN employee and an active participant in LHC activities, he cannot be considered independent.

* Gian Giudice - Dr. Giudice has been a member of CERN's theory division since 1993. His career has always been closely associated with collider research. Before he came to CERN he had worked at Fermilab, and had worked together with Prof. Steven Weinberg [during] the construction of the ‘Superconducting Super Collider’. Apart from the fact that his status as an employee of CERN means that he cannot be considered an independent party, one can immediately see from the first chapter of his recently published book about the LHC that Dr. Giudice hardly possesses the objectivity expected from a person responsible for as serious a task as the independent assessment of the safety of the LHC.

* Igor Tkachev - Prof. Tkachev was a member of CERN's theory division from 1999 until the publication of the first version of the LSAG safety report. Prof. Tkachev also has a permanent position with the Institute for Nuclear Research in Moscow. The existence of this longstanding affiliation does not change the fact that he is a long-term associate of CERN and participated in the LSAG as a member of CERN's theory division.

On the basis of these facts, it is clear that this group can in no way be considered an independent committee. For this reason alone it is appropriate that collisions at the LHC be suspended until a thorough and independent review of the project has taken place.

To put this issue in a wider perspective, it is worth noting the words of law professor Eric E. Johnson in his published critique of the legal aspects of the LHC's approval and operation:

‘It is remarkable to think for a moment how CERN’s situation might be viewed if, instead of operating a particle accelerator, CERN was a developer of pharmaceuticals. If a pharmaceutical firm attempted to take a drug to market based on the safety assessment of a panel of five of its employees, who in turn relied on the scientific work of one employee and one other scientist with a pending visiting position with the firm—it would be a scandal of epic proportions.’ (Original paper attached.)

Just as serious is the question of how the Federal Council could have the audacity to claim that this committee is independent when, quite obviously, that is not the case. In addition to the physical risks that the LHC still poses, this issue highlights a grave political risk which can be considered as a threat to our democracy. When honourable members of the Federal Assembly submit a question to the Federal Council, they rightly expect – and also deserve – an honest answer. However great the disagreements about the political paths and priorities of the Government may be, the factual accuracy of the Federal Council's answers should never have to be called into question. In this case we are faced with not just a minor error, but a completely false representation of a fact of the utmost importance.

We further note that the Federal Council incorrectly informed the Federal Assembly when it said:

de
‘Der entstandene Bericht wurde danach vom Scientific Policy Committee überprüft und von einem Panel von fünf unabhängigen Wissenschaftern bewertet.’

fr
‘Le rapport a été validé par le Comité de politique scientifique et évalué par un panel de cinq scientifiques indépendants.’

it
‘Il rapporto attualizzato è stato verificato dal “Scientific Policy Committee” e valutato da un gruppo di cinque ricercatori indipendenti.’

[en]
'The resulting report was then vetted by the Scientific Policy Committee and evaluated by a panel of five independent scientists.'

As the Federal Council noted, the SPC is responsible for determining the scientific strategy of CERN. The reality was that this second panel of five persons was not a separate and additional body: it was composed entirely of members of CERN's Scientific Policy Committee (SPC). Consequently, its members cannot be considered independent parties when it concerns the assessment of the safety of the LHC. Thus far, no independent scientific media has published a single report demonstrating that the LHC poses no significant risk to Switzerland or the world.

We trust that the Control Committees recognize the urgency and importance of the issues raised in this letter.

The possibility of strangelet production at the LHC is a profound ethical issue which must be investigated thoroughly and objectively. The attached report demonstrates that the current safety arguments related to strangelets are plainly contradicted by the statements of physicists specializing in this field. These contradictions must be examined before further increases in the luminosity or energy of heavy ion collisions at the LHC are permitted.

The question of the independence of the LHC Safety Assessment Group is central to this whole issue. The lack of an independent and objective assessment of the experiment is likely the root cause of the public disquiet about this project. What is particularly disturbing, however, is that the Federal Council had misled the Federal Assembly about the independence of both the LHC Safety Assessment Group [LSAG] and the five-member panel which subsequently reviewed the LSAG report. As a general policy, there should be no tolerance for any deception of the Federal Assembly by the Federal Council - on any issue. But in this particular case, when it comes to something as important as the survival of all, we should have no tolerance whatsoever for such false statements.

We call upon the Control Committees to undertake a full investigation of this issue and ensure that those responsible for these transgressions must publicly justify their actions.

[Further personal statement from the Signatory]

[Name of Signatory]

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References:

Eric Penrose, ‘How CERN’s Documents Contradict its own Safety Assurances: Plans for “Strangelet” Detection at the LHC’
http://www.heavyionalert.org/docs/CERNContradictions.pdf

Eric E. Johnson, ‘The Black Hole Case: The Injunction Against the End of the World’
http://arxiv.org/abs/0912.5480

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Nationalrat

Conseil national

Consiglio nazionale

Cussegl naziunal

[National Council]

[Name and Address of Recipient]

Control Committee
CH-3003 Bern

www.parlament.ch
gpk.cdg@parl.admin.ch

9 June 2011

Supervisory request concerning the heavy ion collisions at CERN's Large Hadron Collider and the related misinformation of the Federal Assembly

Dear [Name of Recipient]

By letters dated 31 January and 3 February 2011, as well as your electronic submissions of 16 and 17 February 2011, you have addressed the Control Committees (CC) of the Federal Councils. In your submissions you call on the Committees on the other hand, to conduct an investigation into whether the heavy ion collisions at the Large Hadron Collider (LHC) of the Organisation Européenne pour la Recherche Nucléaire (CERN) could create tiny black holes which could pose a threat to Switzerland and the world, and, on the other hand, check whether the Federal Assembly was misinformed about the independence of the expert committee responsible for the safety evaluation of the LHC.

According to Article 169 paragraph 1 of the Federal Constitution (FC; SR 101) in conjunction with Articles 26 and 52 of the Parliament Act (ParlA SR 171.10), the CC exercise supervision over the Federal Council, the Federal Administration, the Federal Courts and the other bodies entrusted with the tasks of the Confederation. CERN, the European Organisation for Nuclear Research, with its headquarters in Meyrin, Switzerland, is not, however, subject to the supervision of the CC. With regard to issues related to the safety of scientific research at CERN, the CC can therefore not deal with your submission.

The CC examine citizens' submissions from the standpoint of parliamentary supervision in accordance with Art. 129 of the Parliament Act insofar as they contain evidence of any possible systemic shortcomings or dysfunctioning in the implementation of laws or in the management of federal authorities or other bodies entrusted with the tasks of the Confederation. According to their operational principles, the CC deal with individual cases only insofar as they have a systematic significance.

Indeed, the Federal Council seems to assume in its answer of 26 November 2008 to the interpellation of National Council member Daniel Vischer (08.3621) that the experts who were commissioned in the year 2008 to update the safety report of 2003 concerning heavy ion collisions at the LHC were explicitly independent of CERN. To what extent this assumption is wrong or what would have been the justified way, within the mandate of the Safety Assessment Group, to update the analysis of 2003 in the light of new experimental results collected at CERN, can in our opinion remain an open question. There is no documented evidence whatsoever that the Federal Council had intentionally misinformed the Federal Assembly, or that the – apparently – inadequate information of the Federal Assembly and the allegation, related to the facts described by you, of breach of official duty by the Federal Council constitutes a systemic problem which would justify an intervention of parliamentary supervision. Therefore, we have come to the conclusion that for us no action is required.

We regret that we cannot assist you in this matter, and remain yours sincerely

CONTROL COMMITTEE
Subcommittee DFI/DETEC

The President:	The Secretary:
[Signature]	[Signature]
Max Binder National Council	Philipp Mäder

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Heavy Ion Alert's Response to the Control Committees

In response to the reply received from the Control Committees, Heavy Ion Alert would like to make the following points:

The Control Committees should read the arguments in a submission before replying to it

The Control Committees of the Swiss Federal Assembly play an essential role in ensuring that the Federal Administration is accountable to the Swiss people. It is encouraging that the Committees call upon citizens to inform them of deficiencies in the functioning of the Swiss Government [1]. It is unlikely, however, that these committees will be able to fulfil their role if they do not read the most important parts of the submissions they receive. The first three pages of Heavy Ion Alert's submission [2] to the Committees describe in detail the issue of possible strangelet production at the LHC. Not once in the whole submission are black holes specifically mentioned – though of course the risks related to this are also in need of independent review. Yet, the reply from the Control Committees [3] refers only to 'tiny black holes', and makes no mention at all of strangelets.

The Control Committees should examine the role of the State Secretariat for Education, Research and Innovation

The reply from the Committees states that CERN is not under their supervision. While it is true that CERN is not under their direct supervision, the State Secretariat for Education, Research and Innovation (SERI), which handles the Federal Government's funding and participation in CERN [4,5], is most certainly under the supervision of the Control Committees. What the Control Committees need to examine is how the Secretariat could contribute hundreds of millions of Swiss francs to a major international project without verifying that it would be safe for both Switzerland and the world.

The Control Committees should investigate why the Government did not notice that LHC safety arguments are contradicted by CERN scientists

The need for a review of this case is highlighted by the insecure nature of the current safety arguments for the LHC – given the various clear contradictions between CERN's official safety assurances and the independent statements of its scientists. This regards the likely production of strangelets; the possible production of negative strangelets; the stability of small strangelets; the existence of experimental evidence for strangelets etc., which were discovered and documented by Heavy Ion Alert [6] through a straightforward review of the relevant scientific literature – a standard procedure that should be expected of any government agency involved in such a project. The fact that the Government is unaware of these issues – or is denying awareness of them – strongly suggests that there is no effective system of regulation within the State Secretariat responsible for Swiss participation in the LHC.

The Federal Council's failure to recognize clear conflicts of interest is a matter of serious concern

With respect to the Federal Council's statement that the LHC Safety Assessment Group (LSAG) is composed of CERN-independent experts [7], the Control Committees assert that, 'There is no documented evidence whatsoever that the Federal Council had intentionally misinformed the Federal Assembly' [3]. The Control Committees do not

indicate whether they had actually used their investigative powers to verify this claim, but even if it is true, it is perhaps even more shocking that the Federal Council could not recognize the glaring conflicts of interest of the LSAG members [2,8]. If the Federal Council was not able to tell, for example, that such a prominent representative of CERN as Professor John Ellis [9-15] is not a 'CERN-independent expert', then it seems that the Council is far too easily fooled on such matters. Clearly, there was no justification at all for claiming that LSAG members were 'CERN-independent experts'.

There were no grounds to justify CERN staff drafting an 'independent' safety report

Regarding the Control Committees' suggestion that perhaps it was appropriate for CERN to be responsible for updating the 2003 safety report 'in the light of new experimental results collected at CERN' [3], we would point out that no relevant experimental results were collected at CERN itself during this period. The new experimental results which the LSAG report refers to took place over 6000 km away at the Relativistic Heavy Ion Collider (RHIC) in Long Island, New York [16]. Those results were all publicly available, so there was no special reason to involve CERN scientists in the process.

The conflicts of interest in this case should be considered a major scandal

As quoted in our original submission, law professor Eric E. Johnson argues that:

> It is remarkable to think for a moment how CERN's situation might be viewed if, instead of operating a particle accelerator, CERN was a developer of pharmaceuticals. If a pharmaceutical firm attempted to take a drug to market based on the safety assessment of a panel of five of its employees, who in turn relied on the scientific work of one employee and one other scientist with a pending visiting position with the firm—it would be a scandal of epic proportions. [17]

Do the Control Committees truly believe that this issue, one which involves the safety not only of Switzerland, but of the whole world, is not a scandal worthy of their attention?

The Government should be careful upon whom it relies for its information

An important systemic issue related to the Federal Government's participation in CERN and other international collaborations is the question of who the Government relies on for its information. For many projects, the Government appoints an individual from the relevant department to serve on the project's governing board. As a member of the board, that individual participates in the decision-making process and may, over time, develop a sense of loyalty to the project and pride in their own involvement. Problems can arise, however, when a governing board reaches a collective decision on a controversial issue. Can the individual that the Government had appointed be relied on for a complete and unbiased briefing on the matter, or will his or her report be slanted in favour of the collective decision? Does the Government rely on only that person for its information, or is there a robust procedure to independently verify his or her input? For example, when the Federal Council told the Federal Assembly that, 'CERN Council also regards it as absolutely essential to accurately understand the possible risks involved in the operation of the LHC' [7], was it because the Federal Council had objectively determined that this was CERN's strong moral position, or was the Federal Council simply repeating the words of a CERN Council member?

To see that this is not a purely theoretical concern, consider the following claim made by a member of CERN's Council prior to the start-up of the LHC. Dr Jean-Pierre Ruder was at that time the head of Multilateral Research Cooperation in the State Secretariat for

Education and Research (the predecessor of SERI) [18,19] and had for several years been one of the Swiss representatives on CERN's Council [20,21]. To reassure the Swiss public about the safety of the LHC, Dr Ruder apparently informed Blick.ch that an independent commission of scientists from around the world had recalculated CERN's calculations three times forwards and backwards [19]. In reality, there has never been an independent commission that has verified CERN's safety arguments for the LHC. At best, Dr Ruder was referring to the Scientific Policy Committee (SPC) of CERN, which for the purpose of claiming some independence in the LHC's review process, CERN had been trying to bill as an independent body [22]. The SPC is, in fact, a subsidiary body of CERN's Council [23] and an integral part of the management structure of the organization. In the very same session of Council in which the SPC presented its oral briefing about the safety of the LHC, it also presented and received unanimous approval for its draft budget for CERN for 2009 and its medium-term plan for the organization for 2009–2013 [24,25]. By no stretch of the imagination can the SPC be considered an 'independent commission' in relation to the LHC or any other activity of CERN – a fact that any member of CERN's Council would know. If a Council member could wilfully mislead the Swiss public about the independence of the safety review process for the LHC, what would stop him or her from also trying to mislead the Swiss public's representatives sitting in the Federal Assembly?

The personal interests of Swiss delegates to CERN's Council should be thoroughly investigated

A further issue of concern is the possibility that personal interests influenced the judgement and conduct of the Swiss representatives on CERN's Council. At the time of the approval of the LSAG report, the two Swiss representatives on the Council were Professor Ulrich Straumann from the University of Zürich [26] and the previously mentioned Dr Jean-Pierre Ruder from the State Secretariat [21]. Within a fortnight of the Council's approval of the LSAG's flawed safety report, Professor Straumann and Dr Ruder began their terms as 'Project Leader' and 'Project Administrator', respectively, of a new multimillion-CHF project entitled, 'C-15 Swiss Centre of Advanced Studies in Particle Physics in the LHC Era' [27-29]. Since this project was predicated on there being an 'LHC Era', one can naturally wonder whether they had put their personal interests ahead of their country and the world in giving a green light to the LHC on the basis of a suspect safety report. This is an important conflict of interest which the Control Committees should thoroughly investigate.

The Government cannot allow the academic community to take all the responsibility for identifying potential risks of research projects

A broader systemic issue is the degree to which the Federal Government is leaving it for the academic community to flag up potential safety concerns regarding the LHC or other scientific experiments. As noted in Heavy Ion Alert's submission to the Control Committees, in a December 2007 edition of '*CMS Times*' (the newsletter of the LHC's 'Compact Muon Solenoid' collaboration), a scientist with the CASTOR detector plainly stated that strangelets 'are likely to be produced' in heavy ion collisions at the LHC [30]. Less than seven months later, however, the official safety report for the LHC claimed that it is practically impossible to produce strangelets in heavy ion collisions at LHC energies [31]. As a specific example, it calculated that even if the LHC were to run for the entire lifetime of the Universe, the chances of it producing a single A=10 strangelet (i.e. a strangelet with a mass of approximately 10 protons) would be less than one in a thousand. At no point did the official safety report even mention that there was, and still is, a specialized detector dedicated to observing strangelets produced at the LHC [32]. Thus far, no scientist associated with CERN, CMS, or any of the other LHC experiments has publicly called for CERN to reconcile these contradictory positions. Moreover, to the best

of our knowledge, not a single member of the worldwide particle physics community has dared to raise this issue in a public forum. The State Secretary for SERI has stated that his Department gives 'great importance . . . to ensuring the autonomy and direct responsibility' of researchers, and that, ‘for the most part, policy makers do not interfere with academic activities’ [33]. While such an approach may be politically convenient, this case demonstrates that this policy is wholly inadequate for regulating the potential risks of unprecedented experiments.

An effective regulatory system is needed for unprecedented experiments

The Control Committees concluded their reply with the assertion that none of our allegations 'constitutes a systemic problem which would justify an intervention of parliamentary supervision' [3]. In this letter, however, we have so far provided evidence of several major systemic problems. Another such critical systemic problem is the lack of a regulatory system for extreme and unprecedented events. While a myriad of aspects of everyday life are subject to a well-defined and sometimes onerous regulatory regime, there is a gaping hole when it comes to the regulation of potentially catastrophic situations. For example, the official environmental impact study for the LHC devotes over 14 pages to analysing the visual consequences of LHC-related buildings, but not one to assessing the potential risks associated with producing new forms of matter [34]. The two safety reports subsequently produced by CERN [35,8] were not actually prepared as part of any official regulatory framework and were not subject to a process of formal external review involving public consultations. Rather, they appear to have been produced in order to fit with CERN’s public relations strategy to ensure the unimpeded start-up of the LHC [22]. Developing a reliable framework for avoiding potentially catastrophic or existential risks is urgently needed not only for the LHC, but also for other areas of scientific research and experimentation.

A special effort must be made for the regulation of international projects

This challenge is even more pressing when it comes to regulating international research projects. However inadequate the framework to avoid these risks may be at a national level, such protection is reduced to practically nothing at the international level. As mentioned in our submission, Heavy Ion Alert had been informed by the U.S. Department of Energy that, ‘After a detailed application process, operation of the LHC has been approved by the nuclear regulatory authorities of the host countries, Switzerland and France’ [2]. Other countries have also assumed that Switzerland, the primary host of CERN, has conscientiously taken all possible measures to ensure the safety of the LHC and other CERN experiments. Furthermore, it is stated in Article 26 of the Switzerland-CERN Treaty : 'Nothing in the present Agreement shall affect the right of the Swiss Federal Council to take the precautions necessary for the security of Switzerland' [36]. On the other hand, the Federal Council has explicitly told the Federal Assembly that Switzerland incurs no international liability for the actions or omissions of the organization, and CERN itself is responsible for any damage it might cause [37]. We are left, then, with a situation in which it appears that no elected official has accepted any direct responsibility for the potential risks of the LHC. This situation is a threat to everyone, and must be addressed as soon as possible.

The Control Committees' initiative to evaluate the independence of regulatory and supervisory bodies should be expanded to cover the issues we have raised

On a positive note, we very much welcome the recent decision of the Control Committees to evaluate the independence of Swiss regulatory and supervisory bodies [38]. This is definitely a step in the right direction. However, it appears that this investigation is limited to assessing the independence of bodies that presently exist, and it will not examine situations where there is effectively no regulatory structure at all. As described above, for the catastrophic risks potentially associated with certain international experiments, this is a particularly acute problem. We would urge the Control Committees to help address this gap by formally investigating the issues that Heavy Ion Alert has brought to their attention.

The Federal Assembly and the Federal Council should commission a truly independent and interdisciplinary panel of experts to examine the safety arguments for the LHC

Finally, we call upon both the Federal Assembly and the Federal Council to establish a robust regulatory framework for the LHC. It is of no benefit to the Swiss people or the rest of humanity to say that Switzerland is not liable for any damage caused by CERN. Switzerland retains an undeniable obligation to ensure that experiments at CERN do not endanger its citizens or the planet. That obligation cannot be fulfilled without first addressing the documented flaws [6] in the current safety report for the LHC. We strongly urge the Federal Assembly and the Federal Council to commission a truly independent and interdisciplinary panel of experts [39] which, along with a remit to consider LHC safety critical submissions from the public, would closely examine the existing safety arguments that support operation of the LHC. The LHC programme of high-energy collisions should only be permitted to recommence if this panel finds that those arguments are rigorous and reliable.

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For three examples of M. Cavalli-Sforza's LHC research, see:

M. Cavalli Sforza, 'Collaboration Board decisions on ATLAS organization in 1998/1999', *CERN,* Geneva, *(*10 January 2000), pp.2 pdf, ATL-GEN-2000-001, <https://cds.cern.ch/record/683994/files/gen-2000-001.pdf>, CDS: 683994 [Archived by WebCite on 27 November 2014 Δ]

Note: M. Cavalli-Sforza is listed for the ATLAS Collaboration in both papers below:

(ATLAS Collaboration), 'Design, Construction and Installation of the ATLAS Hadronic Barrel Scintillator-Tile Calorimeter', *CERN*, Geneva, pp.21 pdf (29 November 2007), ATL-TILECAL-PUB-2008-001; ATL-COM-TILECAL-2007-019, <https://cds.cern.ch/record/1071921/files/cer-002727517.pdf>, CDS: 1071921

(ATLAS Collaboration), 'Expected performance of the ATLAS experiment: detector, trigger and physics', *CERN*, Geneva, 2009, 3 vol., CERN-OPEN-2008-020, <https://cds.cern.ch/record/1125884/files/CERN-OPEN-2008-020.pdf> arXiv: 0901.0512, (14 Aug 2009), ISBN: 9789290833215, CDS: 1125884

For G. 't Hooft's talk at CERN involving LHC predictions and his article promoting LHC, (both in 2007), see:

G. 't Hooft, 'Demystifying Quantum Mechanics: Will there be hints from LHC?' invited talk, CERN Colloquium, CERN, Geneva, 11 January 2007, presentation slides

Note: G. 't Hooft discusses LHC discovery prospects from 1hr 11mins 45secs in this video of the above presentation:
G. 't Hooft 'Demystifying Quantum Mechanics: Will there be hints from LHC?' video podcast of lecture, recorded at CERN Colloquium, CERN, Geneva, 11 January 2007, 16:30, (CERN, Geneva), 1hr 21mins 55secs, <http://cds.cern.ch/record/1563535>, [accessed 4 December 2014]

G 't Hooft, 'The Making of the Standard Model', from 'The Large Hadron Collider', *Nature* **448**, Issue 7175, 19 July, pp.271-273, doi: 10.1038/nature06074, CDS: 1060271

> Note: In this article G 't Hooft concludes:
> 'In the strongest possible terms, as theorists, we now urge our friends in experimental science to do whatever they can to obtain further information on the properties of nature's building blocks at the tiniest possible scales in our business, this means reaching for the highest attainable energies: the Large Hadron Collider will make such a step. We can hardly wait.'

For two examples of B. Webber's LHC research, see:

C. Anastasiou, G. Dissertori, F. Stoeckli, B. Webber, 'QCD radiation effects on the H->WW-> l v l v signal at the LHC', *J. High Energy Phys,* **3** (17) (18 January 2008), pp.16, <http://iopscience.iop.org/1126-6708/2008/03/017/pdf/1126-6708_2008_03_017.pdf>, arXiv: 0801.2682 [hep-ph] (18 February 2008), doi: 10.1088/1126-6708/2008/03/017, CDS: 1081436

Note: B. Webber is listed as contributor for this workshop:
E Reya and P. M Zertas (Conveners): F. Berenda et al. (Contributors) 'Top physics at LHC: Summary and Theoretical Basis', Large Hadron Collider Workshop at European Committee for Future Accelerators, Aachen, Germany, 4- 9 October 1990, pp.24, pdf, <https://cds.cern.ch/record/216775/files/CM-P00052129.pdf>, doi: 10.5170/CERN-1990-010-V-2.296, CDS: 216775

For two examples of F. Zwirner's early LHC research, see:

Z. Kunszt, F. Zwirner, 'Testing the Higgs Sector of the Minimal Supersymmetric Standard Model at LHC', Large Hadron Collider Workshop, v.2, Aachen, Germany, 4 - 9 October 1990, pp.578-603, (November 1990), 39pp. pdf, CERN-TH-5944-90, ETH-TH-90-49, <http://cds.cern.ch/record/215082/files/199102180.pdf>, doi: 10.5170/CERN-1990-010-V-2.578, CDS: 215082

E. Salvioni, G. Villadoro and F. Zwirner, 'Minimal Z' models: present bounds and early LHC reach', (16 November 2009), 29pp. pdf, CERN-PH-TH-2009-160, DFPD-09-TH-17, <http://iopscience.iop.org/1126-6708/2009/11/068/pdf/1126-6708_2009_11_068.pdf>, arXiv: 0909.1320 [hep-ph] (30 October 2009), doi: 10.1088/1126-6708/2009/11/068, CDS: 1205611

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[26] U. Straumann, 'Information about Straumann, Ulrich', academic home page, *Physik-Institut, Universität Zürich*, last updated on or after October 2013, <http://www.physik.uzh.ch/~strauman/> [archived by WebCite on 31 August 2014 Δ]

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[29] Swiss Institute of Particle Physics (CHIPP), 'Swiss Centre for Advanced Studies in Particle Physics in the LHC Era', project proposal to the Schweizerische Universitätskonferenz (SUK), *Swiss Institute of Particle Physics*, submitted on 17 June 2007, 8pp. pdf (odd pages only), <www.chipp.ch/documents/Gesuch_C15_20070617_final.pdf> [archived by WebCite on 31 August 2014 Δ]

U. Straumann and J.-P. Ruder, 'Particle Physics in the LHC Era', project report for the period 1.1.2008 – 31.12.2008, *Swiss Institute of Particle Physics*, no date (February 2009?), 7pp. pdf, <http://www.chipp.ch/documents/SwissCentreForAdvancedStudiesInPP_AnnualReport2008.pdf> [archived by WebCite on 31 August 2014 Δ]

U. Straumann and J.-P. Ruder, 'C-15 Swiss Center of Advanced Studies in Particle Physics in the LHC Era', project report for the period 1.1.2009 – 31.12.2009, *Swiss Institute of Particle Physics*, 22 February 2010, 8pp. pdf, <http://www.chipp.ch/documents/SwissCentreForAdvancedStudiesInPP_AnnualReport2009.pdf> [archived by WebCite on 31 August 2014 Δ]

U. Straumann and J.-P. Ruder, 'C-15 Swiss Center of Advanced Studies in Particle Physics in the LHC Era', project report for the period 1.1.2010 – 31.12.2010, *Swiss Institute of Particle Physics*, 14 February 2011, 10pp. pdf, <http://www.chipp.ch/documents/SwissCentreForAdvancedStudiesInPP_AnnualReport2010.pdf> [archived by WebCite on 31 August 2014 Δ]

U. Straumann and J.-P. Ruder, 'C-15 Swiss Center of Advanced Studies in Particle Physics in the LHC Era', project report for the period 1.1.2011 – 31.12.2011, *Swiss Institute of Particle Physics*, 7 February 2012, 11pp. pdf, <http://www.chipp.ch/documents/Gesamtprojekt_inhaltl_Bericht2011_final_signed.pdf> [archived by WebCite on 31 August 2014 Δ]

U. Straumann and J.-P. Ruder, 'C-15 Swiss Center of Advanced Studies in Particle Physics in the LHC Era', project report for the period 1.1.2012 – 31.12.2012, *Swiss Institute of Particle Physics*, 25 February 2013, 8pp. pdf, <http://www.chipp.ch/documents/Gesamtprojekt_Schlussbericht_Inhalt2008-2012_final_signed.pdf> [archived by WebCite on 31 August 2014 Δ]

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see also:
J. Ellis, G. Giudice, M. Mangano, I. Tkachev, and U. Wiedemann (LHC Safety Assessment Group), 'Review of the Safety of LHC Collisions', *CERN*, 20 June 2008, 15pp. pdf, arXiv: 0806.3414v1 [hep-ph] (20 June 2008), <http://lsag.web.cern.ch/lsag/LSAG-Report.pdf> [archived by WebCite on 31 August 2014 Δ]

Note: For the final version, see [8].

[32] CASTOR Detector (Collaboration), website maintained by P. Katsas, ‘CASTOR detector: Centauro And STrange Object Research’, *CERN*, no date, <http://cmsdoc.cern.ch/cms/castor/html/> [archived by WebCite on 31 August 2014 Δ]

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Note also Article 10 of the subsequent 2010 Treaty given below:
Swiss Federal Council, French Ministry for Foreign and European Affairs and CERN Council, 'Agreement between France, Switzerland and CERN relating to protection against ionising radiation and the Safety of the Organization's facilities', 16 September 2010, Draft of agreement (as approved by Swiss Federal Council on 18 June 2010) requiring CERN Council's approval: <https://cds.cern.ch/record/1298699/files/001298699_English.pdf>, CERN Council approves draft: <http://council.web.cern.ch/council/en/governance/Decisions156Sept10.html>, CDS: 001298699

> 'Nothing in this Agreement shall affect the right of the Swiss Federal Council or the 'French Government to take appropriate measures, which may include requesting CERN to suspend the operation of its Facilities, in the interest of the security of Switzerland or France in accordance with the provisions of Article 26 of the Headquarters Agreement or Article XXII of the Status Agreement respectively.'

[37] M. Calmy-Rey [Federal Councillor], ‘08.5323 – Question Period. Question Vischer Daniel. CERN’, National Council, Autumn Session 2008, Eleventh Sitting, 29 September 2008, 14:30, *Bulletin officiel - Les procès-verbaux du Conseil national et du Conseil des Etats*, Ed. F. Comment, in *Die Bundesversammlung - Das Schweizer Parlament*, <http://www.parlament.ch/ab/frameset/f/n/4805/281528/f_n_4805_281528_281560.htm>

in response to:
D. Vischer [National Councillor], ‘08.5323 – Question Period. Question: CERN’, 29 September 2008, Curia Vista - Geschäftsdatenbank, in Die Bundesversammlung - Das Schweizer Parlament, <http://www.parlament.ch/D/Suche/Seiten/geschaefte.aspx?gesch_id=20085323>

[38] Parliamentary Control of the Administration (PCA), ‘2013 Annual Report of the Parliamentary Control of the Administration: Appendix to the 2013 Annual Report by the Control Committees and the Control Delegations of the National council and the Council of States’, *Die Bundesversammlung - Das Schweizer Parlament*, 31 January 2014, 3pp. pdf, <http://www.parlament.ch/e/organe-mitglieder/kommissionen/parlamentarische-verwaltungskontrolle/Documents/jahresbericht-pvk-2013-e.pdf>

For further details, see:

Parliamentary Control of the Administration (PCA), ‘Jahresbericht 2013 der Parlamentarischen Verwaltungskontrolle Anhang zum Jahresbericht 2013 der Geschäftsprüfungskommissionen und der Geschäftsprüfungsdelegation der eidgenössischen Räte’, *Die Bundesversammlung - Das Schweizer Parlament*, 31 January 2014, 28pp. pdf, <http://www.parlament.ch/d/organe-mitglieder/kommissionen/parlamentarische-verwaltungskontrolle/Documents/jahresbericht-pvk-2013-d.pdf>

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[39] For further comments on this issue, see:

M. Leggett, ‘Review of the risk assessment process used for the 2008 LHC safety study’, September 2009, 14pp. pdf, <http://www.grmp.org/upload/Review_of_LHC safety review_sept_1__09.pdf>

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