Candidacy for CMS Spokesperson

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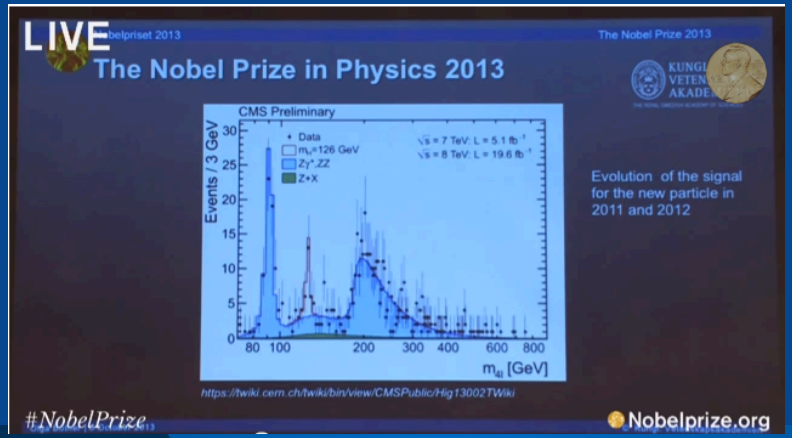
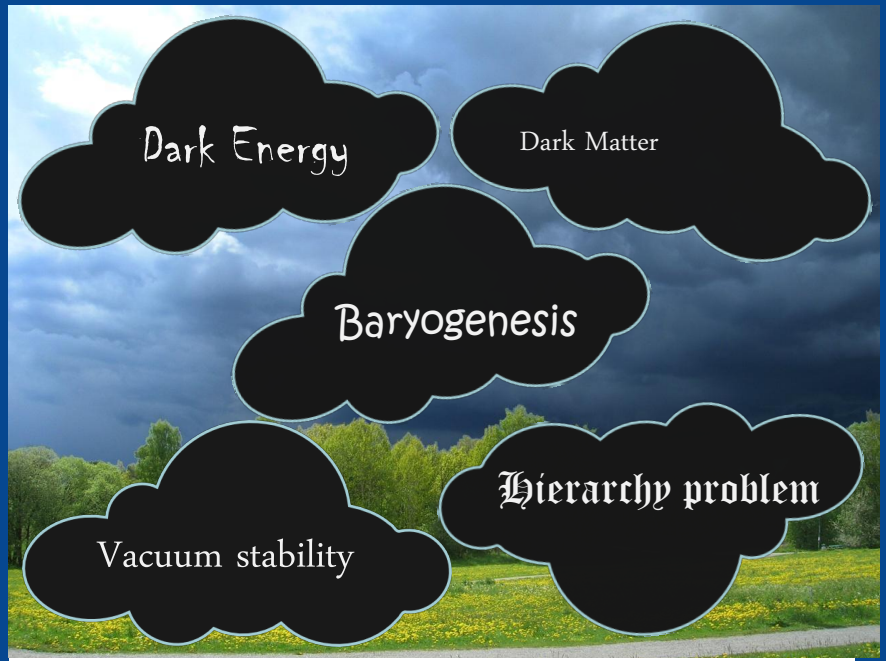
Presentation to

Hungarian CMS Group

Jan. 25, 2016





Prof. Sreerup RAYCHAUDHURI –CMSDAS India

Physics Outlook

- We believe that new **discoveries await us** at **13 TeV** and **high luminosity.**
  - These discoveries may come **quickly**, in the next several months, might show up in the next spokesperson's mandate, **or could come much later**.
  - There might be a striking signal in a single channel or a signal may emerge slowly out of large backgrounds from a multiplicity of hiding places.
  - They may **appear in places where we have long been searching,** e.g. SUSY, Extra Dimensions, etc. or may surprise us by coming from unexpected directions and opening novel horizons.
- We are confident that they are there and we will find them!
- But, we have to keep the detector operating efficiently in the face of increasing pileup and long term radiation damage and aging.

Note: Term is from September 1, 2016 – August 31, 2018

General Challenges

- We are in a new regime with an **expanding project list**
  - Operations and maintenance
  - Physics analysis
  - Software and Computing
  - The Phase 1 Upgrade
  - The Phase 2 Upgrade.

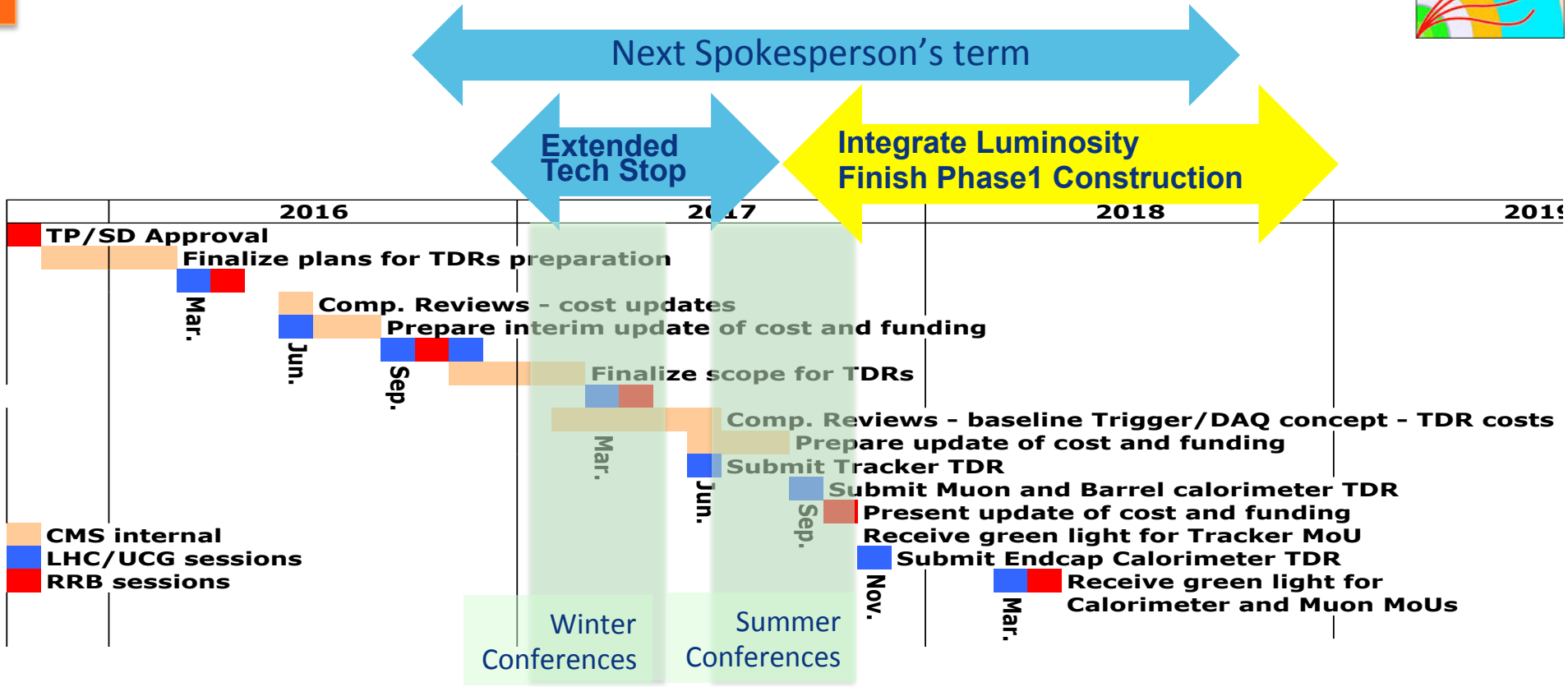
Ongoing Program

Peaking

A Major New Element

- **We face an uncertain level of funding worldwide Which was not so true during the construction phase**
- **There are significant "sustainability" issues**
  - **Personnel turnover** related to
    - **retirements** of key contributors and
    - the **migration** of young people to other endeavors;
  - **Burn out** of people who have been working so hard for so long.

Task "Pileup" in 2017



Summary of Our Problem

- Task “Pileup” continues in 2018
- CMS is undertaking a heavy new load with a declining supply of people, experience, and money. We can only succeed if we do some things differently.

We must not miss the opportunity presented by the full data set acquired in 2016 and need to analyze it quickly

Management Challenges

- **Continued success depends on our ability to address, in a timely manner, existing problems and to anticipate and prepare for new ones.**
- With the expanding project load, it has become difficult for a spokesperson and two deputies to conduct a broad and timely attack on all our problems.
  - Little time left for long-range planning
  - Decision-making has become reactive
  - Examples:
    - **Limited effort to improve the engagement of each institute and demographic**
    - Development of long-term sustainability plan is lagging
    - Planning for Software and Computing has just resumed
    - Little time to evaluate practices in Physics
    - Sometimes unchecked "Better is often the enemy of the good" syndrome leads to non-optimal use of people resources

Elements of Our Approach - I

- Broad and effective participation worldwide is essential at all levels
  - Add new collaborators by making CMS as welcoming as possible to them.
    - However, the opportunities are limited
  - Work to increase the participation of every institute in CMS by working with each institute and each part of the world to help remove or reduce obstacles to their involvement
    - This will require a continuous effort from part of the expanded management team
  - Establish a more open, supportive and transparent management that encourages discussion and participation
  - We have been talking to many institutions around the world and they are very excited to to see our interest in their specific situations and to learn that we will focus on engagement
- Manage the workload: Rigorously evaluate the project list, timelines, and milestones
  - Reduce the absolute load where possible
  - Stretch the load out to ameliorate "pileup"
  - Manage expectations to make sure they are reasonable and achievable

Elements of Our Approach - II

- Augment management capability with a broader, more diverse leadership team and delegate to it the responsibility to work on the extra load
  - Empower task forces and planning boards to take on problems, make recommendations, and take actions within approved guidelines.
    - **These will be more than just advisory!!!!**
    - Designate strong leaders and empower them to solve problems
      - With specific charges/goals, timelines, and resources
    - Present thinking is ~6-8 such entities, targeting specific concerns
    - **Spokesperson is responsible for all activities taken in his/her name**
- No change to the existing lines of decision taking and responsibilities, i.e. spokesperson, MB, CB…
- This is a evolutionary cultural "shift" to significant delegation

Examples – I

- **Engagement Team** – work continuously with institutes to understand what they need to be effective in CMS and try to help them get it
  - Goal is to respond to shortfalls in effort by trying to make individuals and groups more effective
  - **Where possible, use long term institutional or "cluster" commitments via MOUs tailored to each group**
- Work Efficiency Task Force
  - **Tools and practices to make people more efficient and effective, and especially to facilitate more remote participation and leadership**
  - **Try to achieve coordination with fewer meetings**
- Sustainability Planning Board
  - identify areas where turnover will lead to critical exposure to performance and develop strategies to mitigate, such as better documentation
- **Young Physicist Task Force**
  - Special and continuous attention and action on issues affecting our young, non-tenured scientists, ~50% of CMS (>50% of the actual effort). Young people should feel we are fighting
    - to give them the best chance to stay in HEP
    - **to find exciting alternative opportunities if they cannot**

Examples – II

- Urge the current management to form an Extended Year-End Technical Stop Physics Readiness Task Force that will span the transition period of Spokespersons
- **Software and Computing Planning Board (may be able to use existing structures, which have been recently updated)**
  - Projections for Run 2 and beyond
  - R&D program – new strategies and architectures
  - Technology tracking
  - Software and algorithms
- **Physics Practices Evaluation**
  - Process for engaging collaboration in discovery and "non-discovery"
  - Evaluation and improvement of our publication process
  - Improved connection to theory community
    - Provision of physics information in useful form (ATLAS does better)
    - New ideas and approaches, especially if new physics proves elusive

Advantages of this Approach

- Provides for a much **more dynamic management** to flexibly adapt to the breadth and volatility of new challenges and anticipate problems
  - Accomplish tasks that would otherwise not be done in a timely fashion
- **Provides opportunities for people who have shown leadership skills to exercise them and develop them**
  - Provide more opportunities for young leaders
  - Provide natural way of continuing to serve for more senior leaders
- **Wider discussion and participation in decisions will improve "transparency", which is a fundamental commitment.** A key element of engagement is to improve transparency, make sure that reasons for decisions are clearly presented, and expect and encourage orderly and respectful debate

Experience Qualifying Me to Execute This Plan

- Many leadership positions (just a few highlights)
  - Scientific Leadership: **Initiated experiments, made the physics case, and built international collaborations**
    - Fermilab E687, "Photoproduction of Particles containing Heavy Quarks" – co-spokesperson
    - FOCUS – Fermilab group leader
    - BTeV – co-spokesperson
    - **Leader in heavy flavor physics**
  - Projects
    - Designer and project manager, Fermilab Wideband Electron/Photon Beam (450 GeV electron operation is a world record)
    - Early development and use of computing clusters
    - Worked on tracking, triggers, particle identification, and online software

Experience Qualifying Me to Execute This Plan

- Management Positions (Fermilab)
  - Division Head- Computing
  - Associate Head – Particle Physics Research
  - Assistant Head – Beams
  - Department Head – instrumentation
  - Department Head - external beam operations
- Some Examples of Service to HEP community
  - Recent NSF P5 Implementation panel (Young-Kee panel) (2014)
  - BELLE – KEK Program Advisory Committee (PAC) and CLEO/CESR PAC
  - US High Energy Physics Advisory Panel (HEPAP)
  - HEPAP Subpanel on the Future of High Energy Physics (1994) – plan after termination of the SSC
  - Organizer SNOWMASS 2013,Lepton-Photon 2003, SNOWMASS 2001
  - Numerous reviews for DOE and NSF, e.g., LIGO, IceCube, SNAP/JDEM, Deep Underground R&D

CMS Experience

- Editorial team of CMS HL-LHC Technical Proposal [2015]
- Editorial team of CMS HL-LHC "Scope" document [2015]
- Coordinator, CMS Software, Computing, and Analysis Challenge [2014]
- Co-author, Nature Article on $B_s \rightarrow \mu^+\mu^-$ with LHCb [2014]
- SUSY Conference Talk Reviewer (2015 –present)
- Organized with US/ATLAS counterpart, CMS and ATLAS case to P5 panel in US
- U.S. CMS Operations Program Manager (49 institutions, ~700 PhDs and graduate students) [2007 - 2013]
  - Program went from Construction → Commissioning → Data-taking → Analysis
  - Attended Resources Review Boards (13/14 of them)
- Advisor to CMS Management Board [2007-2015]
- Member of CMS Finance Board [2007-2013]
- Member of 15 ARCS, of which I chaired 8 [2010-2015]

CMS Experience

- CMS Deputy Upgrade Coordinator [2008 - 2011]
  - You can do a lot as a Deputy!!!
- Coordinator, Phase 1 Upgrade Technical Proposal[2008]
- Led US Phase 1 Upgrade project through two "critical decisions" (Project need (CD-0) and conceptual design (CD-1))
- Manager Forward Pixel Project (construction of detector, delivery to P5) [2005 – 2008]
- Deputy Project Leader, U.S. CMS Software and Computing Project [1998 – 2000], got first DOE approval of S&C project
  - You can do a lot as a Deputy!!!
- Models of Networked Analysis at Regional Centres MONARC, chair, architecture working group) [1999 – 2000]

A Good Match to the Upcoming Challenges

- I have handled many complex, tough assignments where I have had to get strong, passionate people to work together
- I will move to CERN and spend 100% of my time on being your spokesperson
  - I am well-established in the Geneva area already

My Outlook

- Work to include and empower as many of our colleagues worldwide as possible by **tailoring** their tasks to their particular conditions and having an open, transparent decision-making process in which they feel involved
- Expand the effort to make CMS a center of scientific excellence
  - where it is a pleasure to work and to learn
  - where standards are high but there is support to help people achieve them
  - where people know their participation is valued
  - where they feel their concerns are heard and taken into account in decision-making by a management that listens

Concluding Remarks

- CMS is engaged in one of the greatest intellectual adventures of our time.
- We have already made a major discovery, the Higgs!
- We now have the opportunity to do something really grand!!!
- The spokesperson must be a leader in the cultural sense, who can engage our CMS members all over the world in the experiment and make sure they know theyare appreciated, because in the end you, our scientists, are the real heroes …
  - The passion and commitment of CMS collaborators in every part of the world to learn something new about nature is the sine qua non for CMS' success!

Thank you for your attention and for your consideration of my candidacy. I am happy to answer questions.