

Joe Incandela: Statement for Spokesperson 2012-13

Introduction

The next few years are going to be very exciting and potentially groundbreaking for our field. They'll also be challenging for CMS. The detector, trigger, DAQ, computing, offline and analysis systems have to continue to perform at unprecedented levels of excellence. We will need to plan well to produce the most important physics results, including potential early discoveries, of the highest quality and timeliness. We must prepare and initiate the upgrades. Our culture and management structures must evolve to confront these challenges.

The 2012-13 period in particular will involve a diverse array of high priority activities for CMS. CMS leadership will require breadth of experience and a good knowledge of all aspects of our program. I believe that my experience in important hadron collider physics analyses, detector projects from physics motivation to design, construction and operation, and many years in CMS have prepared me to do what's best for our collaboration and to enable CMS to continue to be a leader in the LHC physics program.

I plan to listen and talk to the collaboration in order to define and build consensus for our priorities and to take the steps that ensure we all fulfill our goals in an ambiance of collegiality, cooperation and greater intellectual freedom. Our successes will be made possible by engaging more of the collaboration with greater involvement in CMS planning and by doing more activities in parallel. Success will also depend upon our ability to achieve a balance between the pressures of operations and competition for physics on the one hand, and preparation for upcoming phases of the LHC program on the other. Strategic physics planning will need to be carried out far in advance. Most importantly, our upgrades are critical to our future and will benefit from physics insight as well as operations and analysis experience.

To achieve all of these things we will need to foster and reward balanced contributions by region, country, and institution to CMS physics, operational service roles, and upgrades. *The precedents we set now can ensure our success for decades to come.*

The job of the Spokesperson (SP) in 2012-13: Three critical areas

I. Continuation of the $\sqrt{s} = 7-8$ TeV pp and Heavy Ion physics programs: The run in 2011 will provide us with one to a few fb⁻¹ of pp data and a substantial increase in Pb-Pb data. This will provide us with ample opportunities for discovery. We can then expect roughly a factor of 2 more data in 2012. The next SP for 2012-13 must focus on getting the most out of these data. *For pp collisions* we will press ahead in our work for the Higgs searches while SUSY and Exotica searches need to have equally high priority. We'll be rapidly extending our reach for new physics. Evidence of candidate dark matter events, heavy resonances, long-lived particles etc. could appear relatively early in the run and by the end of 2011 we could have clear excesses or hints of signals beyond SM expectations. *For Heavy Ions* we will build on our strengths and also pursue important studies to probe this exceptional state of matter we have only begun to study. More involvement of the CMS pp community and the attention of the SP will be needed.

We may need to adapt our program for 2012 in response to what we see in 2011. This takes careful near- and medium-term planning. The winter technical stop will provide us with an opportunity to review what we have learned and prepare for these new data. By end of 2011 we will have a good jump on the program for 2012. The new administration will work with the collaboration to adjust or stay the course as dictated by what we learn. *I would make advance planning a high priority and I would ensure broad involvement of CMS for consensus and "buy-in".*

II. Launching of the upgrades: The period 2012-13 will see final preparations and start of installation and commissioning of various muon, trigger, and calorimeter upgrades. It will also include early preparations for the next rounds of upgrades (some of which may take place in extended winter technical stops). *This is an activity that will benefit significantly from a SP with experience in detectors and particularly with upgrades.*¹ Upgrades are crucial to the renewal and competitiveness of major collider experiments. As SP I

¹See: J. Incandela *Nucl.Instr.Meth.A579:712-717,2007*

would devote much attention and energy to helping secure funding and participation in the upgrades. Physics needs to be involved. I have experience in all aspects of upgrades from studies of the impact on physics, to design, proposal for funding, construction and operation.

- III. **Preparation of the physics program for 2014 at $\sqrt{s}=13-14$ TeV.** We will again enter a new energy regime in 2014 and must prepare for it thoroughly in order to not miss early discoveries. We will need to refine our understanding and operation of upgrades to the detector, trigger, computing and software. Major exercises of all systems could be performed that include as many Higgs and critical new physics searches as possible - along the lines of the October Exercise in 2009. *Advance preparation will be the key to being competitive.* Moreover, we might need to adjust our physics groups and other management structures to best reflect the lessons we learn in the 2010-2012 run.

How to succeed: In order to achieve success in these 3 critical areas I believe we need to make some important changes. *I would continue to foster stronger engagement of the collaboration in the important decisions* and strategies for CMS' future. *I would include more new faces in management, and more generally a widespread feeling of "ownership" in CMS while maintaining continuity* in management. *I would consult broadly and draw heavily upon the experience of the knowledgeable, experienced collaborators.* If it has not already taken place, *I would take steps to move as far as reasonably possible toward more parallel approvals, reviews and submissions of publications by physics groups. I would also make sure that we prepare our students and post-docs for important next steps in their careers.* I would work with the CB to prepare resources for jobs available in high energy physics, astroparticle physics, or other areas of research. We will ensure that our best and brightest get strong support from high profile members of the collaboration.

Greater Engagement: The start of LHC pp physics and Heavy Ion physics has ushered us into a new era for CMS. Our priorities are now centered on everything from the pressing, real-time needs of detector sub-systems, and data-handling infrastructure, (trigger, DAQ, DQM, AICa, PVT etc.), to fast and reliable data reprocessings, MC production, and broad geographical distribution of data for analysis, measurements, approvals and publications. *The physics era is upon us and it represents a substantial increase in the breadth and level of activities underway in CMS and also in the demands placed upon each of us.* Not all things have scaled up well to the level required for an experiment of the unprecedented size and complexity of CMS. It is important to start to do much more in parallel and this will require more members of the collaboration to be more empowered and more engaged in leadership.

Balance and a broader definition of physics

Over the past two decades we have seen a substantial shrinkage in the range of critical activities that are considered to be physics. This may have been necessitated by the transition to bigger experiments and physics programs but it has gone a little too far and we need to readjust. *To be successful we need our regions, countries and institutes to balance their involvements across physics, operations, and upgrades.* This can be established by meeting with management to establish a memorandum of understanding (MOU) for specific service responsibilities, for example. *Meetings with CMS top management would enable them to learn more about the collaboration's needs and capabilities.*

Early and comprehensive planning as the key to competitiveness, quality and productivity

We were well prepared to answer the challenge of the startup. We had more time to prepare than first anticipated and we made great use of that time. We carried out an intense level of effort in which all of our key areas of operation were honed over many years and tested in large scale challenges like CSA07. Many of the analyses on 2010 data were "practiced" in real time in the October Exercise held in 2009. The lessons we can take away are simple. *We must anticipate, plan and test, well in advance of need. This is one area where we may be starting to slip.*

It is a great privilege to be a part of CMS and it would be a great honor to be Spokesperson during this important stage in the life of the experiment. This is the time to set important precedents. As Spokesperson I would listen to the collaboration and foster engagement and consensus to do what is best for CMS.