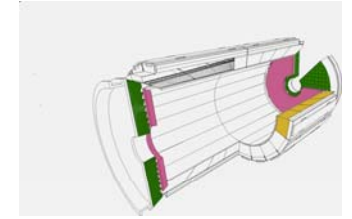




## ECAL and SLHC

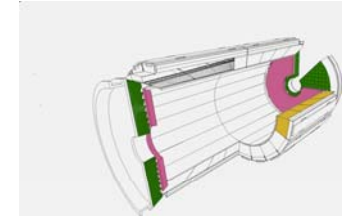


ECAL is in a different situation as other CMS sub-detectors relative to SLHC

- While the upgrades required for example for the Tracker, the Trigger or HCAL are relatively well defined (even if the detailed implementation of these upgrades is yet to be understood), ECAL upgrades are not specified and all options, from almost nothing (except Trigger) to a complete change of the Endcap calorimeter, are still open.
- I understand that we must not miss the present opportunity to preserve funding for future ECAL upgrades
- I believe that changes will be necessary
- However, **I think that we should have a coherent and rational approach endorsed by the ECAL community**



## ECAL

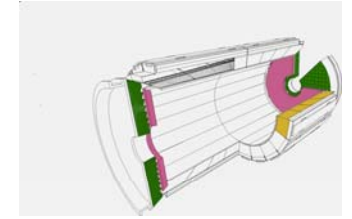


This approach should be dictated by

- The **SLHC physics** and the corresponding performance required for ECAL
- An **understanding** (confirmed by an **experimental study**) **of the damage** to the present detector performance.
  - Unfortunately, we have no time to wait for the in-situ radiation damage effects as the integrated luminosity may increase too slowly in the next few years to measure the ultimate damage effects
  - Laboratory and test beam work is needed
- Practical aspects such as **possible limitations due to induced activity**
- **Budgetary constraints** to be discussed within the CMS collaboration
  - For example, is it reasonable to think about replacing the complete EE+ES (cost of present detector is about 35 MCHF)?



## SLHC physics requirement

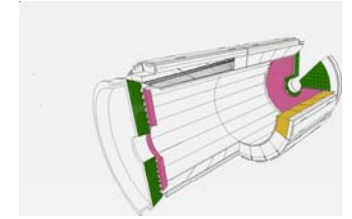


- It is essential to understand the SLHC physics requirements for ECAL
  - Which physics for the forward region ?
  - Do we want to identify electrons ? (is it even possible to identify electrons with 300 underlying events?) . Isolated or imbedded in jets ?
  - Which energy resolution do we need ?
  - We probably want to measure jets (for example W/Z decays). What is the impact on jets if ECAL resolution is much worse than today ?
  - Can an excellent timing help?...
- This is not an easy task (in some sense it is more complicated than  $H \rightarrow \gamma\gamma$  ).

HELP from physics groups is needed !



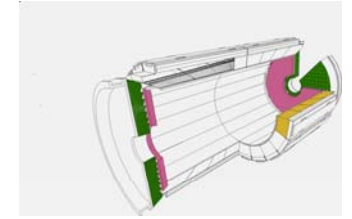
## EE & ES at SLHC



- Assessment of EE at SLHC
  - Performance of VPTs
  - Performance of heavily irradiated crystals
    - Experimental work and simulations needed
  - Electronics
- Possible replacement of ES or use of the available space



## Induced radioactivity



- In parallel, a correct evaluation of the radioactivity and of the associated limitations is needed
  - No point to invent a fancy upgrade if you can not implement it because crystals are too hot to be removed