- **Comments to minutes**

- Specification for the LHC Beam Interlock System (B.Puccio)

- Overview of the Activities on Machine Protection and their dependencies (R.Schmidt / J.Wenninger)

- AOB
  - Safe LHC Parameters
  - Machine Protection Review
  - "Chamonix" at CERN

Overview of the Activities on Machine Protection and their dependencies

Before a review, it must be clearly defined what is understood by machine protection

- Machine Protection is a complex issue, many systems are involved
- Responsibilities are distributed
- What is the role of the Machine Protection WG?
- LHC-OP (R.Bailey) asked us to give an overview

Recall Mandate of MPWG

- The machine protection system shall protect all equipment of the LHC accelerator against uncontrolled release of energy stored in the magnet system and the beams. At the same time it must allow for efficient operation.

- The main sub-systems for equipment protection are the quench protection system, the beam dump system, the beam loss monitor system and the collimation system. They need to be integrated and interfaced to other systems, such as the powering, beam instrumentation, RF, cryogenics, LHC experimental detectors, access, vacuum valves, injection elements, SPS as injector, etc. Interfaces between all systems for machine protection are via reliable links (machine interlock system) and via the control system.

- The working group shall ensure a **coherent integration of all those sub-systems into the machine protection system**, **as well as that efficient diagnostics is provided**. **Interfaces to the access and personnel interlock system** shall be defined in collaboration with the AIWG and InjWG. **Interfaces to the control system** shall be defined in collaboration with the LHC Controls Project.

- Taking into account operational phases (such as powering of one LHC sector without beam, injection tests and operation with circulating beams) and failure scenarios (such as quenches, power converter trips, beam losses, etc.) the **working group shall define**:
  - Overall **architecture of the machine interlock system**
  - **Input channels to the machine interlock system**
  - **Procedures for the operation of the machine interlock system** and **tools for diagnostic** (enable powering, enable beam, post mortem recording, etc.)
  - **Interfaces,** either via hardware links, or via the control system
  - **Specific hardware to be developed**, constructed and tested
  - **Software interlocks required** for safe machine operation
- The working group **shall approve all essential elements that are included in the machine interlock chain** and will address questions related to the reliability of the machine protection system.
- The working group shall **report to the LHC Beam Commissioning Committee**, and will keep the other LHC Committees informed, in particular TCC.

Machine protection elsewhere

Working groups

EEWG: protection during magnet powering

InjWG: protection from extraction of beam from the SPS up to beam in the LHC

Projects

Collimation project

Beam Dump

LHCOP: operational procedures

red / pink- systems required due to large stored energy (pink – not yet in baseline)
blue – systems always required