

## **Changes in QPS**

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During the upcoming first long shutdown LS1 of the Large Hadron Collider LHC, the protection system for the superconducting elements of the LHC will substantially be upgraded with the principal objectives to extend its diagnostic capabilities and to enhance the system immunity to ionizing radiation. All proposed measures will serve as well in increasing the overall system dependability.

The supervision of the quench heater circuits of the LHC main dipoles will be enhanced by adding additional measurement channels for the discharge current and increasing the sampling frequency and resolution of the related data acquisition systems. By this measure it will be possible to identify potential fault states of the quench heater circuits, which may affect the integrity of the concerned magnet. At this occasion all main dipole protection systems will be submitted to general overhaul after four years of successful exploitation.

The consolidation measures for the protection systems within the radiation to electronics project will be concluded by installing the latest versions of radiation tolerant quench detection systems. In addition some equipment will be relocated to shielded areas.

All LHC main circuits will be equipped with earth voltage feelers allowing monitoring the electrical insulation strength of the LHC main circuits especially during fast discharges.