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Beam Condition Monitoring and Radiation Damage Concerns of the Experiments

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From the very start of LHC operations, the experiments will have a strong interest in monitoring online the beam conditions and radiation levels in and around the experimental areas. Although the equipment in these caverns is designed to tolerate the expected radiation levels in normal operation, such monitoring is seen as key to protecting the detectors from damage due to unexpected short- or long- term beam losses, and necessary for understanding how beam conditions affect the efficient operation of the experiments. This is especially important during the commissioning and early running period of the LHC. As monitoring methods and equipment protection concerns vary amongst the different experiments, this talk will address the general issues associated with reliable beam and radiation monitoring within the experimental areas and the estimation of beam loss and radiation damage in and around the experimental areas. Varying time scales are to be considered, ranging from ultra-fast beam loss, to run-by-run losses, to integrated long-term effects of radiation. Specific examples of monitoring systems being implemented by experiments will be given and implications for machine and experiment operations will be highlighted.

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