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C3Or3A-02: First results of the cryogenics operation for the LHC physics run 3 at the increased energy to 6.8 TeV

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Back in 2018, LHC completed its run 2 physics period. Consolidation, maintenance, and upgrade activities performed during the subsequent long shutdown 2 period (LS2), based on a data-driven approach, allowed for full potential availability of the LHC cryogenics infrastructure before tackling the 2021 magnet quench training campaign, preparing the whole machine for operation at the increased energy of 6.8 TeV.

This paper will first give a summary of the main upgrades, consolidations and maintenance performed during the LS2. Magnet training of the machine to the increased energy of 6.8 TeV will be addressed. Results of the first year (2022) of run 3 physics will be presented, achieving high cryogenic availability in a heavily sustained operational context of the accelerator (beams energy increase, induced heat load, peak & integrated luminosity). Helium inventory management aspects will be discussed, with a particular highlight on the necessary operational adjustments taken to cope with the present supply market evolution. Implementation of several operational modes for cryogenic plants will be presented, towards significant power savings while maintaining nominal physics production at the highest availability rate.

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