Cryogenics Operations 2018

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The LHC Cryogenics availability calculation tool

The operation of the LHC accelerator requires a large cryogenic infrastructure composed of eight independent cryogenic plants at 4.5 K, eight units at 1.8 K and the associated cryo-distribution, supplying each ring sector and using a variety of equipment with over 3’ 500 operating conditions to manage.
Specific conditions must be set in order to allow beams to circulate, and ones that are even more restrictive are required to maintain the beams and allow for physics production. These conditions define the availability of LHC cryogenics.
Meeting the requirements for physics imposes to maximize this availability: constant attention is required on cryogenics and its operational margins as well as reliable and efficient tools to ensure its close follow-up.
This presentation will describe the LHC cryogenic system architecture and get back to the definition of LHC cryogenics availability, as it was set during its initial start-up in 2008. We will explain how the availability is calculated, considering different definition criteria and taking into account operational margins.
We will highlight the optimization and automating of the availability calculation tool, allowing more precise statistics production in less time.
Finally, we will discuss ongoing work to use this new tool in collecting early warning signals data during operation, thus allowing to even more improve the overall availability of the LHC cryogenic system.

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