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The Status of LLRF at ATLAS and New Upgrade

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ATLAS, the world's first accelerator to use RF superconductivity for ion acceleration has undergone a major upgrade to increase the beam transmission efficiency and intensity. A first of its kind, the new CW RF quadrupole (RFQ) was built to replace three superconducting (SC) resonators ($\beta=0.008$ and 0.016). In addition, a new cryomodule of seven 72.75 MHz ($\beta=0.077$) SC quarter-wave resonators has also been developed and put into the operation since 2014. The new SC cavities demonstrated world-record accelerating fields (operated at $2.5\text{MV}/\text{cavity}$) for similar type of cavities. This year, an upgraded 109 MHz cryomodule of 8 quarter-wave SC resonators is installed. New RF systems have been developed and installed for the RFQ and the new SC cavities. For upgraded 109 MHz cryomodule, a digital low level RF (LLRF) system developed by Brookhaven National Laboratory is installed and configured. Numerous modifications have been developed to improve the operational reliability and performance of both SC cavities and RFQ. In this paper, current status of ATLAS RF systems and LLRF control systems will be presented. This work was supported by the U.S. DOE, ONP (Contract No. DE-AC02-06CH11357).

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