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The Future of Ground Based Astronomy: The Technological Possibilities FRANK KRENNRICH, Iowa State University, KAREN BYRUM, Argonne National Laboratory, WHITE PAPER FOR FUTURE GAMMA-RAY OBSERVATORY COLLABORATION — Gamma-ray astronomy has undergone a revolution in recent years. A new window has opened for using gamma-rays to understand and more fully explore the most violent processes of the universe. These gamma-ray observatories include the new ground based telescope arrays of HESS, to the largest ever gamma-ray telescope of Magic, the very soon to be fully operational telescope arrays of VERITAS and the wide field of view water Cherenkov detectors of Milagro and future planned HAWC. These ground based instruments are all perfectly poised to complement the soon to be launched gamma-ray space based observatory GLAST. The continuation of gamma-ray astronomy into the next decade will require a new generation of instruments. In this report, we discuss different technology opportunities and discuss the technical feasibility for substantially improving IACTS and ground based particle detectors to achieve an order of magnitude better sensitivity than the instruments employed today as well as their planned upgrades.

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