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Digital broadband interferometry for mapping lightning at the Pierre Auger Observatory — Markus Cristinziani[1], •Eric-Teunis de Boone[1], Qader Dorosti[1], Stefan Heidbrink[2], Waldemar Stroh[2], Jens Winter[2], and Michael Ziolkowski[2] — [1]Experimentelle Astroteilchenphysik, Center for Particle Physics Siegen, Universität Siegen — [2]Elektronikentwicklungslabor der Physik, Universität Siegen

Lightning-related phenomena are known to interact with and influence all detector systems of the Pierre Auger Observatory in Argentina. Notably, the Surface Detector has recorded unique signals linked to Terrestrial Gamma Flashes (TGFs) which are rare phenomena linked to the initial processes of lightning. Interpreting these signals remains challenging due to the absence of a system capable of providing detailed 3D imaging of lightning propagation.

To address this gap, we are developing BOLT: a state-of-the-art interferometric lightning mapping array that enhances the Observatory's unique capabilities for precision research including TGFs. It consists of radio detectors that have been previously developed for the Auger Engineering Radio Array (AERA), located at strategic positions within the Auger field.

This contribution highlights the recent hardware developments, progress towards selective triggering and precision timing, and first field data, illustrating the growing capability of the system for TGF and lightning studies.

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