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TPC for sPHENIX: New Opportunities to Explore the Early Universe ALEXANDER LINK, VICTORIA GREENE, SOURAV TARAFDAR, Vanderbilt University, SPHENIX COLLABORATION — The observed quark-gluon plasma (QGP), a deconfined state of quarks and gluons, poses a number of exciting new questions in the field of high-energy nuclear physics. Produced from the collision of heavy ions at relativistic speeds, efforts are now being made to determine many of the properties of this primordial state of matter. The sPHENIX project is a proposed upgrade to its predecessor PHENIX featuring advanced new capabilities to further the detection, and ultimate understanding of new phenomena related to the QGP. Simulations were run to determine the most effective tracking system design from a variety of candidates based on the criteria required to achieve the physics goals of our experiment. After considering the benefits and drawbacks of each design, the sPHENIX project ultimately decided to choose a design featuring a Time Projection Chamber (TPC). Once this decision was made, simulations were conducted in order to quantify the charge density, electric field and track distortions so that these confounding factors could be compensated for when collecting and analyzing data. This presentation depicts the results of these simulations and shows how these results inform the design of the tracking system.

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