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<u>Abstract</u>

The Unified Theory of Cosmic Plasma Physics is a grand unified theory based on plasma physics and derived from quantum electrodynamics. The theory's power comes from its effortless solution to Hilbert's 16th Problem. The Unified Theory of Cosmic Plasma Physics supplants heliophysics by employing Fermi Bubbles, Magellanic Clouds, Starspots, Pulsar Glitch, Color Superconducting Neutron Star Cores, and more plasma physics phenomena to solve pressing issues such as the coronal heating problem, final parsec problem, and strong cp problem.

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To solve Hilbert's 16th problem, we investigate relative positions and upper bounds of 2 dimensional polynomial vector fields. Limit cycles are isolated periodic orbits in polynomial planar differential systems - a polynomial vector field possesses an infinite amount of limit cycles.

Investigating the orbital structure of galaxies, we are interested in the birth and disappearance of orbital families, along with their stability and occupied phase space fraction. To this end, limit cycles are an apt representation of the recently discovered Fermi Bubbles. When galaxies collide, their Fermi Bubbles coalesce and grow in size. Thus, neighboring galaxies' Fermi bubbles mapped relative to one another can be used as a solution to the relative position aspect of Hilbert's 16th problem, which necessitates that the largest possible set of Fermi bubbles is the solution to the upper bound aspect of Hilbert's 16th problem.

If Fermi bubbles are dark matter, this differential solution to Hilbert's 16th problem sets limits on the upper bound of dark matter halos. I attempted to prove that Fermi Bubbles are Dark Matter by drastically raising their Mass / Light ratio to solve the Final Parsec Problem. A Coordinate Transformation placing the solar system inside of the primary galactic bar and the Magellanic Clouds as a Spiral Arm of the Milky Way Galaxy is necessary to sustain this model. This position correction solves the Bulk Lorentz Factor Crisis and Axiomatizes Dark Energy.

I gained the confidence to confront Dark Energy, Dark Matter, and Hilbert's 16th Problem only after constructing a Unified Theory of Cosmic Plasma Physics. While improving the state of space weather forecasting to protect astronauts from solar flares, I employed the Unified Theory of Cosmic Plasma Physics to deduce that starspots are holographic black holes,

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solve the Coronal Heating Problem with 2-Step Accretion, and unify Coronal Mass Ejections with Novae, Solar Flares with Pulsar Bursts, and the Local Interstellar Cloud with Nebulae. Furthermore, taking the Solar Cycle as the Pulsar Spin Rate of the Sun's Color Superconducting Neutron Star Core and the GCR Cycle as the Pulsation of a Pulsar Wind Nebula leads naturally to solar cycle periodicity equations.

Not only does the sun's neutron star core solve Einstein's missing pulsar problem if extrapolated to all stars, but also the polarization concomitant with pulsar kick makes single stars appear as symbiotic binaries; these binaries are actually single quark stars, thus conserving the strong interaction and solving the Strong CP Problem.