Abstract Submitted
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Numerical optimization of magnetic surfaces of CNT[1] SOO KYOUNG KIM, Bronx High School of Science — The Columbia University Non-neutral Torus (CNT) is a stellarator built to study the equilibrium, stability, and transport of non-neutral plasmas confined on magnetic surfaces. CNT uses four circular, planar coils: two interlocking coils and two poloidal field (PF) coils. A computational re-optimization of CNT has been performed, adding a second set of PF coils. Two relevant physics parameters were varied, the current running through the coils and their locations - the two additional coils were placed symmetrically at three different distances from the machine center: 0.203 m, 0.305 m, and 0.406 m. The magnetic surface quality was assessed by a C++ program producing graphs of the cross-section of magnetic surface. A configuration was identified with a larger confined volume and a potentially increased confinement time. Possible applications include positron trapping and confinement of positron-electron plasmas. Creation and study of the first earthbound electron-positron plasmas is a future goal and relevant to fundamental plasma physics. CNT studies plasmas with extreme electric fields relevant for fusion research, which has the goal of clean energy.

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