

Abstract Submitted
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Generation of rotational transform in a toroidal confinement device with tilted coils LUCAS ZEPPETELLO, MICHEL DOUMET, KENNETH HAMMOND, BEN ISRAELI, JUSTIN MANN, FRANCESCO VOLPE, Columbia University, ANTHONY CLARK, United States Military Academy, DONALD SPONG, Oak Ridge National Laboratory, SAMUEL LAZERSON, Princeton Plasma Physics Laboratory — Experimental evidence was obtained, by means of an electron beam, that rotational transform can be generated in a toroidal configuration constructively similar to a tokamak, but solenoid-free and featuring six tilted toroidal-field coils. The coils are planar and, in fact, circular, hereby the device name CIRCUS [1]. In addition, the coils are interlinked to each other, which helps reducing the aspect ratio but is not strictly required. Comparisons between calculations and field-line mapping measurements will be presented, as well as predictions for devices featuring more coils, resulting in more axisymmetric plasmas. These are expected to operate at lower plasma current than a tokamak of comparable size and magnetic field, which might have interesting implications for disruptions and steady-state operation. Additionally, the toroidal magnetic ripple is less pronounced than in an equivalent tokamak in which the coils are not tilted.

[1] A. W. Clark et al., *Fusion Eng. Des.* **89**, 2014

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