# Supertoroidal Electrodynamics

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**Abstract: This talk will present recent developments in toroidal electrodynamics, focusing on new types of pulses exhibiting non-diffracting propagation and spatiotemporal superoscillations, and on non-reciprocal light-matter interactions involving charge-current configurations of toroidal topology.**

Toroidal electrodynamics is a newly emerging field of electromagnetism studying excitations of toroidal topology, both in free-space (as toroidal pulses) and in matter (as toroidal charge-current configurations). Recent advancements in this area have introduced a new class of pulses known as supertoroidal pulses, which possess topological features akin to skyrmions found in condensed matter and exotic propagation dynamics, such as non-diffracting propagation over arbitrary distances, energy transfer patterns reminiscent of "vortex streets" in fluid dynamics, and space-time superoscillations. Additionally, their localized counterparts in the form of supertoroidal charge-current configurations are shown to lead to new non-radiating configurations and to non-reciprocal electromagnetic interactions.

**References**

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