Fusion Energy: Status and Perspectives
From Scientific Breakthroughs to Industrial Reality

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Abstract:

Fusion has made remarkable progress over the past decades, bringing the prospect of a new source of low-carbon, large-scale electricity closer to reality. Yet turning scientific achievements into a reliable, economically competitive energy technology remains a formidable challenge.

The lecture will review the current status and prospects of fusion energy, focusing on the key technological and engineering challenges that must be overcome: high-field superconducting magnets, plasma-facing components, tritium breeding, neutron-resistant materials, remote maintenance and the integration of these systems into an industrial power plant.

The lecture will then explore how Europe can accelerate the transition from research to industrial deployment, drawing on the experience and vision of Gauss Fusion. Its approach is based on stellarator technology, proprietary key technologies and established European industrial capabilities, with a staged roadmap towards an industrial demonstrator and, ultimately, commercial fusion power plants.

The central question is no longer just whether fusion is physically possible, but how to make it an industrial reality.