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*Frontiers of Science*

# TÜBİTAK TBAE SEMINARS

## Anton N. Kapustin

*California Institute of Technology, USA*

## Topological Phases of Matter and Patterns of Quantum Entanglement

***December 29 2022, 11:00 - 12:00 (GMT +3)***

Over the past couple of decades, it has been realized that quantum many-body systems with gapped excitations are surprisingly rich. Phases of such systems often cannot be described in terms of patterns of symmetry breaking. Instead, the current view is that different phases can be distinguished by the pattern of quantum entanglement in the ground state wave-function. In this talk, I will review some examples of entangled many-body states and explain how their nontrivial nature can be detected.

The Research Institute for Fundamental Sciences organizes a lively program of seminars, which is an integral part of its productive research environment. These events are held with the participation of internationally renowned foreign and Turkish scientists, with the aim to discuss the current developments and new ideas in the research areas of the institute and to become the focus of attention of young researchers and students. Seminar programs are announced in advance to welcome broad participation from the scientific and educational community.

**Bio:** Anton Kapustin is a Russian-American theoretical physicist and the Earle C. Anthony Professor of Theoretical Physics at the California Institute of Technology. His research interests lie in quantum field theory and string theory, and their applications to particle physics and condensed matter theory. He is the son of the famous pianist-composer Nikolai Kapustin. Anton Kapustin obtained his Bachelor of Science degree in physics from Moscow State University in 1993. He received his Ph.D. in physics at the California Institute of Technology in 1997 under the supervision of John Preskill. Anton Kapustin has made several groundbreaking contributions to dualities and other aspects of quantum field theories, in particular topological field theories and supersymmetric gauge theories. With Edward Witten he discovered deep connections between the S-duality of supersymmetric gauge theories and the geometric Langlands correspondence. In recent years, he has focused on mathematical structures in classification schemes of topological field theories and symmetry-protected topological phases.

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