

İTÜ



MATEMATİK BÖLÜMÜ

Generalized P/NP Relations, Quantum Periods and the Whitham Hierarchy

Can Kozçaz
Boğaziçi Üniversitesi

In solving the energy spectrum of quantum mechanical systems, non-perturbative corrections to energy levels are often physically decisive, since they control effects such as tunneling, level splitting, and large-order behavior, yet they are notoriously difficult to compute directly. In contrast, perturbation theory is usually much more accessible. Perturbative/Non-perturbative (P/NP) relation suggests that non-perturbative spectral data may be reconstructed from perturbative input. For a class of genus-one quantum systems, together with Çavuşoğlu and Tezgin, we have shown that standard P/NP relations must be generalized when we study deformations of the potential by a parameter. In this talk, I explain how our generalized P/NP relation fits naturally into the Whitham-hierarchy framework, generalizing the earlier work by Gorsky and Milekhin: the deformation parameters define Whitham flows, the perturbative period is held fixed, and the non-perturbative period satisfies the corresponding second Whitham equation.

Tarih: 13 Mayıs 2026 Çarşamba

Saat: 14:30-15:30

Yer: Fen-Edebiyat Fakültesi B1-326

İletişim: kayah17@itu.edu.tr

About the speaker:

Can Kozçaz received his B.Sc. in Physics with High Honors from Bilkent University in 2003, and completed his Ph.D. in Physics at the University of Washington in 2009 with a dissertation titled *“The Refined Topological Vertex and its Applications in Physics and Mathematics”*.

Following his Ph.D., he held postdoctoral research positions at several leading institutions, including CERN in Switzerland, International School for Advanced Studies in Italy, and Center of Mathematical Sciences and Applications at Harvard University. He has been a member of the Department of Physics at Boğaziçi University since 2017.

His research interests include topological string theory, supersymmetric gauge theories, conformal field theories, mathematical physics, non-perturbative physics, resurgence, and the AdS/CFT correspondence.

He is also the recipient of several prestigious awards, including the BAGEP Young Scientist Award and the Mustafa Parlar Encouragement Award.