Barnabás Kolos Tóth

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∂ Pre-undergraduate theoretical physics student with a strong focus on mathematical methods and quantum field theory Multiple international physics olympiad medalist · Award-winning independent research ·

∂² Research Interests

My primary interest lies in theoretical and mathematical physics, with a focus on rigorous mathematical formulations of quantum mechanics and quantum field theory.

∂² Education

Eötvös József Gimnázium, Budapest 2022 – Present
Specialized mathematics and physics curriculum

∂² Awards & Honors

- International Physics Olympiad (IPhO) – *Silver Medal*
- European Physics Olympiad (EuPhO) – *Bronze Medal*, *Honorable Mention*
- National Physics Competitions – top placements
- Semilab Special Prize, Student Research Conference (TDK) – Solutions of the Helmholtz Equation Using Feynman Path Integrals and Green's Functions

∂² Research Experience

· Scientific Student Research (TDK)

Solutions of the Helmholtz Equation Using Feynman Path Integrals and Green's Functions 2025

- Investigated wave phenomena governed by the Helmholtz equation, with emphasis on boundary value problems in nontrivial geometries.
- Applied mathematically rigorous path–integral formulations and Green's function constructions to obtain analytical solutions and develop numerical methods.
- Combined analytical derivations with numerical validation; results were presented at the Student Research Conference (TDK), receiving the *Semilab Special Prize*.

∂² Relevant Coursework

- Special Relativity with emhpasis on Group Theory
- Relativistic Quantum Mechanics with heavy emphasis on Group Theory
- Linear Algebra

∂² Technical Skills

- Programming: Python, basic C/C++
- Tools: LaTeX, Git

∂² Languages

Hungarian (native), English (fluent)

∂² References

Available upon request