Contribution ID: **14** Type: **not specified**

# Alternative derivation of relativistic three-particle quantization condition

*Tuesday, 4 August 2020 14:20 (20 minutes)*

We present a simplified derivation of the relativistic three-particle quantization condition for identical, spinless particles. The simplification is afforded by using time-ordered perturbation theory (TOPT) and a three-particle quasilocal K matrix that is not fully symmetrized to organize the relevant diagrams in an intuitive manner, ultimately leading to a new form of the quantization condition. This form can then be related algebraically to both the standard quantization condition, which uses a fully symmetric three-particle K matrix, and the quantization condition based on extending unitary representations of the three-particle amplitude to finite volume. It should also allow a more straightforward generalization of the quantization condition to nondegenerate particles, and perhaps also to more than three particles.

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**Session Classification:** Hadron Spectroscopy and Interactions

**Track Classification:** Hadron Spectroscopy and Interactions