

Title: The ρ radiative decay width from lattice QCD

Presenter Full Name: Marcus Petschlies

Affiliation: Helmholtz-Institut für Strahlen- und Kernphysik, Universität Bonn

Email: marcus.petschlies@hiskp.uni-bonn.de

Abstract The seminal work by Lellouch and Lüscher on the $K \rightarrow \pi\pi$ transition introduced the rigorous calculation of matrix elements of QCD-unstable states in lattice QCD. Recently, the methods for determining $2 \rightarrow 1$ transition matrix elements on the lattice have taken major strides with the development of the Briceño-Hansen-Walker-Loud formalism towards applicability to a wide variety of transition amplitudes and kinematics.

In the seminar I will cover the results of our lattice QCD calculation of the process $\pi\gamma \rightarrow \pi\pi$. The transition amplitude for this process in the isospin-1 channel is enhanced due to the presence of the ρ resonance. I review our calculation of the $\pi\gamma \rightarrow \pi\pi$ matrix elements on a lattice of size $L \approx 3.6$ fm at pion mass $m_\pi \approx 320$ MeV and the extraction of the transition amplitude in a range of invariant masses s and photon momentum transfer q^2 , as well as the analytic continuation to the ρ resonance pole and the determination of the ρ radiative decay width.