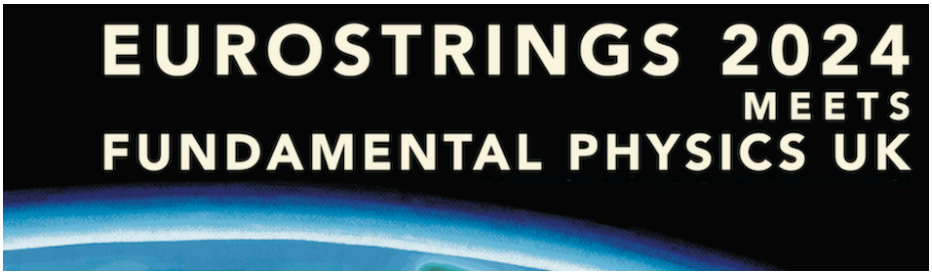

Contribution ID: **168** Type: **Plenary talk**

Scattering amplitudes for Kerr black holes and higher-spin symmetry

Friday 6 September 2024 10:00 (30 minutes)

In a series of recent works it has become clear that quantum scattering amplitudes can be used to gain useful insights into the dynamics of Kerr black holes. A simple infinite family of three-point amplitudes has been found, which describes the primary gravitational interaction of a black hole with quantum spin s. However, the corresponding family of Compton four-point amplitudes has not yet been established, except for a few low-spin examples. These amplitudes are needed for post-Newtonian and post-Minkowskian calculations of binary black-hole systems. Interestingly, the Kerr three-point amplitudes can be uniquely predicted from the principle of higher-spin gauge symmetry. I will discuss the construction of a family of EFTs with Stuckelberg higher-spin fields, which enjoy massive higher-spin gauge symmetry, and that describe the Compton dynamics of Kerr black holes, including non-minimal interactions. I will also use insights from a chiral-field approach that is particularly helpful in ensuring correct degrees of freedom. A Compton amplitude to all orders in spin is obtained, and I will discuss the matching to explicit GR calculations.

Link to publication (if applicable)

Presenter: JOHANSSON, Henrik

Session Classification: Plenary session