

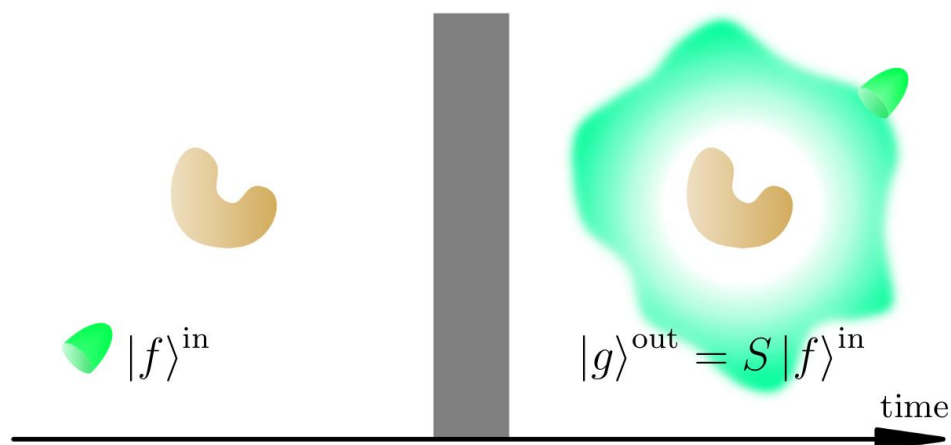
Einladung zum Physikalischen Kolloquium

07.11.2025 **Ivan Fernandez-Corbaton, Karlsruher Institut für Technologie**
»An algebraic approach to light-matter interactions«

Einführung: C. Rockstuhl

Abstract: From nano physics to cosmology, and from computer chips to radiation therapy, Maxwell equations are central in our scientific and technological development. The more we master the theory and engineering of light-matter interactions, the deeper we understand fundamental physics, and the better the technologies that we develop.

My presentation will be about a theoretical and computational framework for the study and engineering of light-matter interactions. The framework rests on the invariance properties of electromagnetism, and is formalized in a Hilbert space whose conformally invariant scalar product provides connections to physical quantities, such as the energy or momentum of a given field, or the outcome of measurements. The light-matter interaction is modeled by the polychromatic scattering operator, which establishes a natural connection to a popular computational formalism, the transition matrix, or T-matrix. I will show that the framework is useful for developing theoretical ideas, and that it applies to diverse situations, such as the interaction of entangled biphoton pulses of light with nanostructures, or the transfer of momentum from light to objects moving at relativistic speeds.



Der Vortrag findet **am Freitag, den 07. November 2025 um 15:45 Uhr** im **Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.