

Institut Ruđer Bošković  
ZAVOD ZA TEORIJSKU FIZIKU

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SEMINAR ZAVODA ZA TEORIJSKU FIZIKU

(Zajednički seminari Zavoda za teorijsku fiziku,  
Zavoda za eksperimentalnu fiziku i Zavoda za teorijsku fiziku PMF-a)

**POINT-FORM DYNAMICS OF RELATIVISTIC  
FEW-BODY SYSTEMS**

**Prof. Wolfgang Schweiger**

Institut für Physik  
Karl-Franzens-Universität Graz  
Austrija

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**Abstract:**

The general problem of formulating relativistic quantum mechanics for a fixed number of particles goes back to the pioneering work of Dirac in which he suggested three different forms of relativistic dynamics, i.e. the instant form, the front form, and the point form. These forms differ by the set of Poincare generators which are interaction dependent. Although it has a number of advantages, the point form has been the least used and is the most unfamiliar of the three forms. My talk deals with a point-form formulation of relativistic few-body systems. I will present a relativistic, Poincare invariant coupled-channel formalism for few-body systems interacting via one-particle exchange. This approach takes the exchange particle explicitly into account and relates the coupling of the exchange particle to an underlying quantum field theory. As illustrative examples I will present vector mesons within the chiral constituent quark model and electromagnetically bound systems like hydrogen and positronium. The vector-meson system allows us to study the effect of retardation in the Goldstone-boson exchange. The investigation of hydrogen and positronium serves as a test of the point-form approach for well studied QED systems and reveals the relation between point-form and instant-form dynamics.

Voditeljica seminara:

Dr. Blaženka Melić