

Abstract Submitted  
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**Field Theory for Multi-Particle System**<sup>1</sup> SHOUHONG WANG, Indiana University, TIAN MA, Sichuan University — The main objectives of this talk are 1) to introduce some basic postulates for quantum multi-particle systems, and 2) to develop a universal field theory for interacting multi-particle systems coupling both particle fields and interacting fields. By carefully examining the nature of interactions between multi-particles, we conclude that multi-particle systems must obey i) the gauge symmetry, ii) the principle of interaction dynamics (PID), and iii) the principle of representation invariance (PRI). Intuitively, PID takes the variation of the action functional under energy-momentum conservation constraint, offers a different and natural way of introducing Higgs fields, and is also required by the presence of dark matter and dark energy and the quark confinement. PRI requires that the  $SU(N)$  gauge theory be independent of representations of  $SU(N)$ . Based on these principles, a few basic postulates for multi-particle systems are introduced in this talk, leading to a field theory for interacting multi-particle systems. A direct consequence of the field theory is the derivation of general atomic spectrum equations.

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