



Семинар  
«МАЛОЧАСТИЧНЫЕ СИСТЕМЫ»  
вторник, 27 ноября 2018 г., 11:00  
аудитория им. Д.И.Блохинцева (IV этаж)

---

## ADIABATIC REPRESENTATION FOR ATOMIC DIMERS AND TRIMERS IN COLLINEAR CONFIGURATION

S.I. Vinitsky<sup>a</sup>, A.A. Gusev<sup>b</sup>, P.M. Krassovitskiy<sup>ac</sup>, and O. Chuluunbaatar<sup>b</sup>

<sup>a</sup>*Bogoliubov Laboratory of Theoretical Physics, JINR*

<sup>b</sup>*Laboratory of Information Technologies, JINR*

<sup>c</sup>*Institute of Nuclear Physics, Almaty, Kazakhstan*

We consider collinear models for a trimer of identical atoms with molecular pairwise interactions and for an atomic dimer scattered by an atom or tunneling through potential barriers. The models are formulated as 2D boundary-value problems in the Jacobi and polar coordinates. In the adiabatic representation the problems are reduced to a system of second-order ordinary differential equations (SODEs) with respect to the radial variable using the expansion of the desired solutions in the set of angular basis functions that depend on the radial variable as a parameter. The asymptotic expansions of the parametric basis functions, effective potentials, fundamental solutions of the systems of SODEs and corresponding asymptotic scattering states were calculated by the elaborated algorithms implemented in Maple. The efficiency of the elaborated method, algorithms and programs is demonstrated by benchmark calculations the resonance scattering, metastable and bound states.