

Abstract Submitted  
for the GEC11 Meeting of  
The American Physical Society

**Using generalized Sturmian basis for two- and three-body scattering problems** ANCARANI LORENZO UGO, Université Paul Verlaine - Metz, Metz, France, GASANEO GUSTAVO, Universidad Nacional del Sur, Bahia Blanca, Argentina — A methodology based on generalized Sturmian functions is put forward to solve two- and three-body scattering problems. It uses a spectral method which allows for the inclusion of the correct asymptotic behavior when solving the associated driven Schrödinger equation. For the two-body case we demonstrate the equivalence between the ECS and the Sturmian approaches, and illustrate the latter by using Hulthén Sturmian functions. Contrary to the Exterior Complex Scaling approach, no artificial cut-off of the potential is required in the Sturmian approach. For the three-body scattering problem, the theoretical framework is presented in hyperspherical coordinates and a set of hyperspherical Generalized Sturmian functions possessing outgoing asymptotic behavior is introduced. The Sturmian procedure is a direct generalization of the method discussed for the two-body problem, thus the comparison with the ECS method is similar. For both the two- and three-body cases, Sturmian basis are efficient as they possess the correct outgoing behavior, diagonalize part of the potentials involved and are essentially localized in the region where the unsolved interaction is not negligible. Moreover, with the Sturmian basis the operator  $(H-E)$  is represented by a diagonal matrix whose elements are simply the Sturmian eigenvalues.

Ancarani Lorenzo Ugo  
Université Paul Verlaine - Metz, Metz, France

Date submitted: 21 Jul 2011

Electronic form version 1.4