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**A break-up model solved in hyperspherical coordinates** ANCARANI LORENZO UGO, Université Paul Verlaine - Metz, Metz, France, GASANEO GUSTAVO, Universidad Nacional del Sur, Bahia Blanca, Argentina, MITNIK DARIO, Universidad de Buenos Aires, Argentina — One way to describe ion-atom break-up processes consists in splitting the total wave function as $\Psi^+ = \Psi_0 + \Psi^+_{sc}$, where $\Psi_0$ is an asymptotically prepared initial state and $\Psi^+_{sc}$ is the scattering solution. Adequate asymptotic behavior should be imposed, and hyperspherical coordinates $(\rho, \alpha)$ are well adapted for this purpose. A Sturmian approach in these coordinates may be used to solve the scattering problem. To test numerically the proposed Sturmian-hyperspherical approach we make use of an analytically solvable model for three particles break up processes with a Coulomb interaction. Closed forms in hyperspherical coordinates are derived for the solution with outgoing wave behavior and for the scattering transition amplitude. They compare very well with numerical results validating the use of the proposed Sturmian hyperspherical approach. Moreover, as all the Sturmian basis functions possess the correct outgoing Coulombic asymptotic behavior and diagonalize not only the kinetic energy but also the Coulomb interaction, the convergence rate is strongly accelerated: only a few basis functions are necessary to reproduce the analytical solutions for both the scattering wave function and the transition amplitude.

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