

A new software to compute MSSM squared amplitudes for particle physics and relic density calculations

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The increasing need of numerical predictions for dark matter models is not always easy to satisfy looking at the software available today. So far, I've been working on a C++ code to compute 2 to 2 squared scattering amplitudes using MARTY. The numerical library generated in this way has been enriched with additional features, aiming at allowing the user to easily include and use such a library in external codes. We restricted ourselves to the tree-level amplitudes in the MSSM relevant to solve the Boltzmann equation. We will soon use this code to generalise such an equation in SuperIso Relic, in order to provide the evolution of the particle densities as a function of the temperature in a freeze-out scenario. Future development of this work will provide a direct interface with SuperIso Relic, the possibility to choose more general models and the possibility of taking into account other effects relevant for DM production such as the Sommerfeld enhancement or some 1 loop diagrams.

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