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A new approach to modeling cosmic ray interactions

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We present a new approach to modeling cosmic ray (CR) interactions, which relies on a very basic interaction picture, while using a reasonable and transparent formalism, in the framework of the Reggeon Field Theory. Our main motivation is to provide a new CR interaction model characterized by relatively transparent physics, sufficient parameter flexibility, and high computational efficiency, which can be easily managed by external users, including a re-tuning of the model parameters. Such a model can be used for studying potential modifications of the interaction treatment, necessary for describing particular sets of data on extensive air showers (EAS) initiated by high energy cosmic rays, at a microscopic level, thereby keeping a consistency with general restrictions, like the unitarity, energy-momentum and charge conservation, Lorentz and isospin invariance. Importantly, this should allow one to study a compatibility of such modifications with relevant accelerator data. The preliminary version of the new model is presented and its results for particle production and for EAS characteristics are discussed.

Collaboration(s)

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