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Assessment of Source and Transport Parameters of Relativistic SEPs Based on Neutron Monitor Data

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Within the Horizon 2020 project HESPERIA, we are developing a software package for the direct inversion of Ground Level Enhancements (GLEs) based on data of the worldwide network of Neutron Monitors (NMs). The new methodology to study the release processes of relativistic solar energetic particles (SEPs) makes use of several models, including: the propagation of relativistic SEPs from the Sun to the Earth, their transport in the Earth's magnetosphere and atmosphere, as well as the detection of the nucleon component of the secondary cosmic rays by the ground based NMs. The combination of these models allows to compute the expected ground-level NM counting rates caused by a series of instantaneous releases from the Sun. The proton release-time profile at the Sun and the interplanetary transport conditions are then inferred by fitting the NM observations with modeled NM counting rates. In the presentation, the used models for the different processes and first findings with the new software will be presented.

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