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# The Ultimate Monte Carlo: Studying Cross-Sections With Cosmic Rays

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## Abstract content

The high-energy physics community has been discussing for years the need to bring together the three principal disciplines that study hadron cross-section physics - ground-based accelerators, cosmic-ray experiments in space, and air shower research. Only recently have NASA investigators begun discussing the use of space-borne cosmic-ray payloads to bridge the gap between accelerator physics and air shower work using cosmic-ray measurements. The common tool used in these three realms of high-energy hadron physics is the Monte Carlo (MC). Yet the obvious has not been considered - using a single MC for simulating the entire relativistic energy range (GeV to EeV). The task is daunting due to large uncertainties in accelerator, space, and atmospheric cascade measurements. These include inclusive versus exclusive cross-section measurements, primary composition, interaction dynamics, and possible new physics beyond the standard model. However, the discussion of a common tool or ultimate MC might be the very thing that could begin to unify these independent groups into a common purpose. The Offline ALICE concept of a Virtual MC at CERN's Large Hadron Collider (LHC) will be discussed as a rudimentary beginning of this idea, and as a possible forum for carrying it forward in the future as LHC data emerges.

## If this papers is presented for a collaboration, please specify the collaboration

## Summary

## Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 655-658

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