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Interdisciplinary Digital Twin Engine InterTwin for calorimeter simulation

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The interTwin project develops an open-source Digital Twin Engine to integrate application-specific Digital Twins (DTs) across scientific domains. Its framework for the development of DTs supports interoperability, performance, portability and accuracy. As part of this initiative, we implemented the CaloINN normalizing-flow model for calorimeter simulations within the interTwin framework. Calorimeter shower simulations are computationally expensive, and generative models offer an efficient alternative. However, achieving a balance between accuracy and speed remains a challenge, with distribution tail modeling being a key limitation. CaloINN provides a trade-off between simulation quality and efficiency. The ongoing study targets introducing a set of post-processing modifications of analysis-level observables aimed at improving the accuracy of distribution tails.

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Classification de Session: Generative and Probabilistic Models

Classification de thématique: Simulations and surrogate models : replacing an existing complex physical model