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## Techniques for model-independent interpretations of hidden particle searches

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Hidden particles can help explain many important hints for new physics, but the large variety of viable hidden sector models poses a challenge for the model-independent interpretation of hidden particle searches. We present techniques published in 2105.06477 and 2203.02229 that can be used to compute model-independent rates for hidden sector induced transitions. Adapting an effective field theory (EFT) approach, we develop a framework for constructing portal effective theories (PETs) that couple standard model (SM) fields to generic hidden particles. We also propose a method to streamline the computation of hidden particle production rates by factorizing them into i) a model-independent SM contribution, and ii) a observable-independent hidden sector contribution. Showcasing these techniques, we compute a model-independent transition rate for charged kaon decays into a charged lepton and an arbitrary number of hidden particles. By factorizing the rate, a single form factor is found to parametrize the impact of general hidden sectors. This is used to re-interpret an existing search for HNLs in NA62 data, which yields model-independent constraints on the rate of producing arbitrary hidden particles.

### In-person participation

Yes

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