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Searching for Lorentz invariance violation with artificial neural networks

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Lorentz invariance violation (LIV) in gamma rays can have multiple consequences, such as energy-dependent photon group velocity, photon instability, vacuum birefringence, and modified electromagnetic interaction. Depending on how LIV is introduced, several of these effects can occur simultaneously. Nevertheless, in experimental tests of LIV, each effect is tested separately and independently. For the first time, we are attempting to test for two effects in a single analysis: modified gamma-ray absorption and energy-dependent photon group velocity. In doing so, we are using artificial neural networks. In this contribution, we will discuss our experiences with using machine learning for this purpose and present our very first results.

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