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XENON1T background modeling and statistical techniques for low background experiments

The XENON1T detector is a dual-phase time projection chamber devoted to dark matter searches through their scattering off xenon atoms in a 2 tonne liquid xenon target. The background rate in the central volume of the XENON1T detector is the lowest achieved so far with a liquid xenon-based direct detection experiment. In this talk I describe the response model of the detector, the challenges of background modeling as well as the used techniques. In a low background experiment is often hard to asses the expected distribution of events due to lack of statistics and to many subtle effects. I describe a novel technique to introduce a well motivated systematic uncertainty to background model based on a calibration sample, which can be relevant to other low background experiments.

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