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CMB spectral distortions: energy release versus photon injection

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CMB spectral distortions caused by energy release in the early Universe create broad distortions that are usually described as superposition of μ -, y - and r -type distortions. These signals will allow us to gain new insights into the pre-recombination Universe, telling us about early-universe and particle physics. There is, however, another way to create distortions: by *photon injection*. One example is related to the hydrogen and helium recombination radiation emitted around $z \sim 1000$, however, similarly decaying and annihilating particle scenarios or super-conducting strings should lead to copious photon production. The types of distortions that are created by photon injection show a much richer phenomenology than the classical μ and y distortions, as I will illustrate in my talk. This may provide additional ways of distinguishing different energy release mechanisms.

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