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Asymmetric dark matter and $2 \leftrightarrow 2$ interactions

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Common mechanisms invoked to explain particle antiparticle asymmetries involve the out-of-equilibrium and CP violating decay of a heavy particle. In this talk I discuss the role CP violating $2 \leftrightarrow 2$ annihilations can play – together with the usual $1 \leftrightarrow 2$ decays and inverse decays – in determining the final asymmetry. I will present a simple toy model to point out the salient features of such a scenario and to illustrate how an asymmetry can arise while respecting CPT and S-matrix unitarity. Annihilations may actually dominate over decays in determining the final asymmetry in certain areas of parameter space. In this scenario related asymmetries are created in two distinct low-energy sectors. Such a mechanism could explain asymmetric dark matter.

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