



**UNIVERSITÄT
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Multi-Species Thermalization Cascade of Energetic Particles in the Early Universe: Application to Non-Thermal Dark Matter Production

Heavy, unstable, and out-of-equilibrium particles with a matter equation of state appear in many well-motivated cosmological histories; examples include the inflaton condensate and moduli fields. Decays of the matter component result in highly relativistic non-thermal SM particles that must subsequently attain thermal equilibrium. We focus on cascades of $2 \rightarrow 3$ gauge interactions of the SM as the primary means of kinematic thermalization at high energies. Paying particular attention to coherent plasma effects and the role of the decaying matter particle's mass and branching ratios, we study the energy-spectra of SM particles emerging from the thermalization cascade. Finally, we will more specifically discuss how our results can be used in a cosmological setup in the example of heavy non-thermal DM production.

Monday, 17 October 2022

16:00 in D6-135

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