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Production, thermalisation and constraints on hidden sector dark matter from asymmetric reheating

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The evolution of the early Universe may have been driven by a hot hidden sector, made of dark matter and possibly other companion particles. Such conditions can be achieved, for instance, by asymmetric reheating from inflaton decay, and open new regions in the parameter space. In this talk, using dark QED as a benchmark model for the dark sector, I will introduce asymmetric reheating and the conditions of thermalisation in the produced hidden sector. Next I will present the main classes of reheating scenarios in this framework and show the corresponding cosmological constraints in the parameter space, with a focus on the unitarity limit on the dark matter mass.

References

2405.10792, 2105.01263, 1806.01865

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