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No room for monopole dark matter

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The magnetic monopole of a dark sector has been advocated as an appealing dark matter candidate, since its stability naturally follows from topological arguments. I will revisit the computation of the monopole abundance generated by a thermal phase transition, exploring the three regimes where the phase transition is second order, weakly first order, or supercooled. This will allow us to identify the parameter space regions where the monopole relic density can match the observed dark matter abundance. However, a dark sector featuring monopoles necessarily contains stable electrically-charged particles, namely massive vector bosons. I will show that the abundance of gauge bosons, under minimal assumptions, is always far larger than the monopole one. This result leads to the conclusion that dark monopoles cannot constitute a sizeable fraction of dark matter in the minimal model, contrarily to what has been previously claimed.

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Classification de Session: Dark matter