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A feeble window on leptophilic dark matter

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In this this talk, I will discuss a leptophilic dark matter scenario involving feeble dark matter coupling to the Standard Model (SM) and compressed dark matter-mediator mass spectrum. I will consider a simplified model where the SM is extended with one Majorana fermion, the dark matter, and one charged scalar, the mediator, coupling to the SM leptons through a Yukawa interaction. I will first discuss the dependence of the dark matter relic abundance on the Yukawa coupling going continuously from freeze-in to freeze-out with an intermediate stage of conversion driven freeze-out. Focusing on the latter, I will then exploit the macroscopic decay length of the charged scalar to study the resulting long-lived-particle signatures at collider and to explore the experimental reach on the viable portion of the parameter space.

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