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A frequentist analysis of proton-philic spin-dependent inelastic Dark Matter (pSIDM) as an explanation of the DAMA effect

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In the proton-philic spin-dependent inelastic Dark Matter (pSIDM) scenario, the yearly modulation effect in the DAMA experiment is consistent with other available constraints: from the latest experimental bounds from XENON1T, PANDAX-II, SuperCDMS, PICO-60 and CDMSlite, we obtain updated ranges of its parameters by constructing their approximate frequentist confidence intervals both in a halo-independent approach and adopting a truncated Maxwellian for the Weakly Interacting Massive Particles (WIMP) velocity distribution. In our halo–independent analysis we have implemented the WIMP halo function in terms of a step–wise parameterization. Our results confirm the present viability of the pSIDM scenario as a possible explanation of the DAMA effect.

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