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Recent results from DAMA/LIBRA-phase1 and perspectives

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The DAMA/LIBRA set-up (about 250 kg highly radiopure NaI(Tl)) is running at the Gran Sasso National Laboratory of the I.N.F.N.. This experiment is mainly dedicated to the investigation of Dark Matter (DM) particles in the galactic halo by exploiting the model independent DM annual modulation signature. In its first phase DAMA/LIBRA has collected data over 7 annual cycles corresponding to an exposure of $1.04 \text{ ton} \times \text{yr}$ (DAMA/LIBRA-phase1). The DAMA/LIBRA-phase1 and the former DAMA/NaI data (cumulative exposure $1.33 \text{ ton} \times \text{yr}$, corresponding to 14 annual cycles) give evidence at 9.3σ C.L. for the presence of DM particles in the galactic halo on the basis of the exploited model independent signature by using highly radio-pure NaI(Tl) target. No systematic or side reaction able to mimic the exploited DM signature has been found or suggested by anyone over more than a decade. After a relevant upgrading occurred at end 2010, DAMA/LIBRA-phase2 is in data taking in the new configuration equipped with new high quantum efficiency PMTs. The aim of the upgrade has been to lower the software energy threshold to 1 keV in order to improve the knowledge on corollary aspects regarding the signal. Here results, implications and experimental perspectives of the presently running DAMA/LIBRA-phase2 will be discussed.

Summary

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