

# Light dark matter in the NMSSM: upper bounds on direct detection cross sections

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In the Next-to-Minimal Supersymmetric Standard Model, a bino-like LSP can be as light as a few GeV and satisfy WMAP constraints on the dark matter relic density in the presence of a light CP-odd Higgs scalar. We study upper bounds on direct detection cross sections for such a light LSP in the mass range 2–20 GeV in the NMSSM, respecting all constraints from B-physics and LEP. The OPAL constraints on  $e^+e^- \rightarrow \chi_1^0 \chi_i^0$  ( $i > 1$ ) play an important role and are discussed in some detail. The resulting upper bounds on the spin independent and spin dependent nucleon cross sections are  $\sim 10^{-42} \text{ cm}^2$  and  $\sim 4 \cdot 10^{-40} \text{ cm}^2$ , respectively

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