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The DarkSide-20k Program

Thursday, 21 May 2026 09:00 (30 minutes)

The search for the nature of Dark Matter remains a major goal of modern physics. DarkSide-20k, now under construction at the Laboratori Nazionali del Gran Sasso, is a 50-tonne dual-phase underground-argon double-phase Time Projection Chamber designed to achieve a background-free exposure of 200 tonne-years. Thanks to argon's strong pulse-shape discrimination, all conventional backgrounds are highly suppressed, leaving only a small irreducible contribution from coherent elastic neutrino–nucleus scattering, expected at the level of 4–5 events. The readout system consists of large-area silicon photomultiplier arrays for precision light and charge readout.

The experiment aims to reach a WIMP–nucleon cross-section sensitivity of order $10^{-48}\,\mathrm{cm}^2$ at a 1 TeV/c^2 mass. This talk will present the scientific motivation, detector concept, and current status of the experiment.

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