



Rome Joint Astrophysics Colloquia

Searching for light dark matter

The Standard Model (SM) of particle physics has been highly successful in describing the fundamental particles and their interactions in the last decades. Nevertheless, the SM leaves unanswered questions, like the origin of matter over anti-matter asymmetry in the Universe, the strong CP problem. On the other hand, the existence of dark matter (DM) is required by the cosmological and astrophysical observations. The scenario in which DM is the thermal relic of the early Universe is thus well justified.

Even though well justified if the governing force is the weak interaction, the parameter space available to GeV-TeV WIMPs has reduced over recent years, so that interest has grown in “hidden” or “dark” sector models. These models assume that DM is made of particles which interact feebly with SM particles via a portal particle, thus greatly enlarging the allowed parameter space.

In addition to solving the DM problem, those models postulating light dark particles could also address some anomalies in particles physics, such as the discrepancy between the experimental results and the calculated SM value of the anomalous magnetic moment of the muon, or the strong CP problem. Another indication of the existence of new, light (MeV-GeV) states seems to come from anomalous e^+e^- pairs production in nuclear physics measurements of light even-even nuclei.

A panorama of ongoing and proposed experiments, capable of testing different models, is presented; those experiments explore different mass ranges and sensitivities, using different production and detection techniques. In particular, the feeble interaction with SM particles opens the possibility of producing these new particles at accelerators.



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Join in person at IAPS-INAF Roma (aula IB09)
or online on Zoom at <https://rebrand.ly/JAC-Valente>

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