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国台学术报告 NAOC COLLOQUIUM

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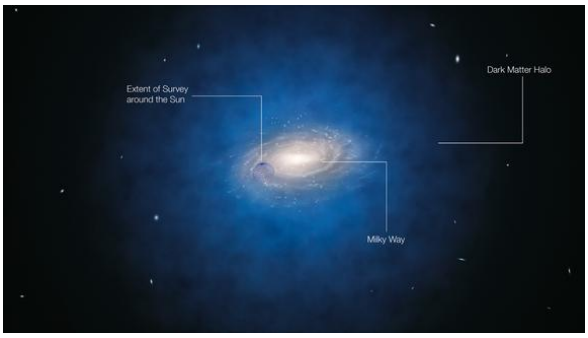
TIME: Wednesday, 3:00 PM, May 16, 2012 LOCATION: A601 NAOC

Hunting Dark Matter at galactic and extra-galactic scales

Dr. Evoli Carmelo (SISSA)

Dr. Carmelo is a PostDoc researcher at the II. Institute for theoretical physics at the University of Hamburg (physically on the DESY campus) in the Astroparticle Group of Prof. Günter Sigl Since 2011. He received his Ph.D. in 2010 in the Astrophysics Sector of SISSA under the supervision of Prof. Andrea Ferrara. His main research interests include intergalactic medium, cosmic rays and astrobiology.

Abstract



The latest years have seen steady progresses in WIMP dark matter (DM) searches, with hints of possible signals suggested by both direct and indirect detection experiments. The density of WIMPs in today’s halos is much smaller than in the early Universe, however there is still a (small but finite) probability for WIMPs to annihilate in pairs and give rise to detectable Standard Model yields. Such indirect DM detection has received a lot of attention in the recent years in connection with the wealth of new data that have become available, especially with the new generation of cosmic- and gamma-ray detectors. In my talk I will show how antiprotons are a precious tool to constrain DM models in our Galaxy. I will show updated constraints on a wide class of annihilating DM models by comparing the prediction obtained with the public code DRAGON against the most up-to-date antiproton measurements. In my talk I will show how such a signal, if observed, would be an indirect signature of the nature of DM. In particular, to model the energy depositions induced by the annihilation products of specific DM models we have performed a precise calculation of the amount of energy that can be transferred from the decay/annihilation products to the IGM, which includes Bremsstrahlung and inverse Compton (IC) processes, along with H/He collisional ionizations and excitations, and electron-electron collisions. Finally, I will show how we have applied the energy deposition results to calculate the DM contribution to the IGM ionization history and to CMBR perturbations.

All are welcome! Tea, coffee, biscuits will be served at 2:45 P.M.

You are welcome to nominate speakers to Shude Mao (shude.mao@gmail.com), Licai Deng (licai@bao.ac.cn), Xuelei Chen (xuelei@cosmology.bao.ac.cn).